Enclosed is a copy of the JP publication 2002-130985 which is the publication of the JP 2000-318443 application. Also enclosed is a machine translation of the publication.

JP 05-118706 corresponds to U.S. RE 35,502 and U.S. Patent No. 5,157,994. JP 05-118706 is the publication of JP 04-072198 which claims priority from U.S. Serial No. 662,747 filed in 1991 which is the application that matured into U.S. Patent No. 5,157,944 and which reissued as RE 35,502. Enclosed is a copy of that JP publication and a machine translation of the publication.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: January 28, 2008

By: _____
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MJS/pmg

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1]
In a refrigerant evaporator which performs heat exchange of cooling fluid and a refrigerant which flow through the exterior,
A refrigerant flow has the 1st turn and the 2nd turn at least between a refrigerant introducing part and a refrigerant derivation part,
It has a core part formed by tube strings which made a tube arrange in parallel, a refrigerant collective part which gather said refrigerant which passed through said 1st turn, and a refrigerant distribution part which distributes said refrigerant to said 2nd turn,
It has tube strings of a single row which forms said 1st turn that said core part is a right-and-left near-full area, and flows into an opposite direction mutually, and said 2nd turn, or a double row,
Said refrigerant collective part has the structure of making right and left dividing a refrigerant of said 1st turn, and gathering,
Said refrigerant distribution part has the structure distributed so that said 2nd turn may be formed in another field in a longitudinal direction with said 1st turn,
Said refrigerant collective part and a refrigerant distribution part are connected via a communicating part of a couple.
A refrigerant evaporator characterized by things.
[Claim 2]
It is a refrigerant evaporator which performs heat exchange of cooling fluid and a refrigerant which flow through the exterior,
A refrigerant flow has the 1st turn and the 2nd turn at least between a refrigerant introducing part and a refrigerant derivation part,
It has a core part formed by tube strings which made a tube arrange in parallel, a refrigerant collective part which gather a refrigerant which passed through said 1st turn, and a refrigerant distribution part which distributes a refrigerant to said 2nd turn,
boil [in front and behind] said core part one side at a time, and it is provided with the 1st tube strings and the 2nd tube strings which form said 1st turn and said 2nd turn, respectively in a right-and-left near-full area
Said refrigerant collective part has the structure of making right and left dividing a refrigerant of said 1st turn, and gathering,
Said refrigerant distribution part has the structure distributed so that said 2nd turn may be formed in another field in a longitudinal direction with said 1st turn,
Said refrigerant collective part and a refrigerant distribution part are intersection circulation parts by which it is connected via a communicating part of a couple and in which a communicating part of this couple carries out right-and-left intersection,
A refrigerant evaporator characterized by things.
[Claim 3]

The refrigerant evaporator according to claim 2, wherein said intersection circulation part is formed in division space where said refrigerant collective part and a refrigerant distribution part are formed by a tank section of a couple allotted forward and backward, and a tank section of this couple is divided and formed in right and left.
[Claim 4]
The refrigerant evaporator according to claim 2, wherein said refrigerant collective part and a refrigerant distribution part are formed by a tank section of a couple allotted forward and backward and said intersection circulation part is formed in way space outside a tank section of this couple.
[Claim 5]
The refrigerant evaporator according to claim 2, wherein said refrigerant set / distribution part are formed by a tank section of a couple allotted forward and backward, it has the refrigerant circulation part separated by at least two and an intersection circulation part is formed in said refrigerant circulation part between tank sections of this couple.
[Claim 6]
It is a refrigerant evaporator which performs heat exchange of cooling fluid and a refrigerant which flow through the exterior,
A refrigerant flow has the 1st turn and the 2nd turn at least between a refrigerant introducing part and a refrigerant derivation part,
It has a core part formed by tube strings which made a tube arrange in parallel, a refrigerant collective part which gather a refrigerant which passed through said 1st turn, and a refrigerant distribution part which distributes a refrigerant to said 2nd turn,
boil [in front and behind] said core part one side at a time, and it is provided with the 1st tube strings and the 2nd tube strings which form said 1st turn and said 2nd turn, respectively in a right-and-left near-full area
Said refrigerant collective part has the structure of making right and left dividing a refrigerant of said 1st turn, and gathering,
Said refrigerant distribution part is formed by a tank section arranged before and behind a couple, and it has the structure distributed so that said 2nd turn may be formed in another field in a longitudinal direction with said 1st turn,
Said refrigerant collective part and a refrigerant distribution part are connected via a communicating part of a couple.
A refrigerant evaporator characterized by things.
[Claim 7]
Said refrigerant collective part and a refrigerant distribution part are formed, respectively by an narrow tank section by which a double width tank section and another side were arranged for one side before and behind a couple,
Said double width tank section equips an inside with a pass partition plate divided into right and left as occasion demands,
The refrigerant evaporator according to claim 6, wherein a communicating part of said couple is formed at both ends of a longitudinal direction, respectively between said double width tank section and an narrow tank section of said couple.
[Claim 8]
The refrigerant evaporator according to claim 7, wherein said double width tank is made into a back core part connected with the 1st tube strings.
[Claim 9]
claims 2-8, wherein said 1st tube strings and the 2nd tube strings are really [provided with two or more independent circulating holes] formed with a flat tube -- either -- a refrigerant evaporator of a statement.
[Claim 10]
It is a refrigerant evaporator which performs heat exchange of cooling fluid and a refrigerant which

flow through the exterior,
A refrigerant flow has the 1st turn and the 2nd turn at least between a refrigerant introducing part and a refrigerant derivation part,
It has a core part formed by tube strings which made a tube arrange in parallel, a refrigerant collective part which gather a refrigerant which passed through said 1st turn, and a refrigerant distribution part which distributes a refrigerant to said 2nd turn,
the 1st tube and the 2nd tube with which said core part forms the 1st turn and the 2nd turn, respectively -- one or more -- every -- alternation -- being considered as single row structure allocated and formed
Said refrigerant collective part has the structure of making right and left dividing a refrigerant of said 1st turn, and gathering,
Said refrigerant distribution part has the structure distributed so that said 2nd turn may be formed in another field in a longitudinal direction with said 1st turn,
Said refrigerant collective part and a refrigerant distribution part are formed by a tank section of a couple allotted forward and backward,
Left-hand side of the 1st turn and right-hand side, and an outflow communicating hole group in which each inflow communicating hole group open for free passage is formed and that is [both] open for free passage with right-hand side of the 2nd turn and left-hand side by a longitudinal direction at an opposite hand are formed in a tank section of said couple, respectively,
A refrigerant evaporator characterized by things.
[Claim 11]
Claim 1, wherein an arranging direction of said tube in said core part is the up-and-down (vertical) direction - a refrigerant evaporator given [any 1] in ten.
[Claim 12]
Claim 1 provided with two or more entrances to said refrigerant introducing part - a refrigerant evaporator given [any 1] in ten.
[Claim 13]
Claim 1 being the multi-flow type with which two or more tubes were arranged so that simultaneous circulation of a refrigerant was possible, and a core part was formed between tank sections of both ends - a refrigerant evaporator given [any 1] in ten.
[Claim 14]
Claim 1 being said multi-path sir pen type with which two or more tubes of a book move in a zigzag direction, and said core part is formed - a refrigerant evaporator given [any 1] in ten.
[Claim 15]
Claim 1, wherein said refrigerant introducing part, said refrigerant discharge part, a refrigerant distribution part, and said refrigerant collective part are formed by a tank section - a refrigerant evaporator given [any 1] in ten.
[Claim 16]
Claim 1 being the composition that a refrigerant flow of the 1st turn in said core part serves as a upflow - a refrigerant evaporator given [any 1] in ten.
[Claim 17]
The directions for a refrigerant evaporator using a refrigerant evaporator of any 1 statement of claims 1-10 combining an internal heat exchanger.
[Claim 18]
The directions for the refrigerant evaporator according to claim 17 using it combining an ejector furthermore.
[Claim 19]
The directions for a refrigerant evaporator, wherein a pressure reducer front stirrup uses a refrigerant evaporator of any 1 statement of claims 1-10 for a refrigerating cycle which has a gas liquid separation device in front of an evaporator.

[Claim 20]
The directions for a refrigerant evaporator using it including in a refrigerant circulation circuit which replaced a refrigerant inlet and an exit for the refrigerant evaporator according to claim 10, and was provided with an usable selector valve.
[Claim 21]
The directions for a refrigerant evaporator using the refrigerant evaporator according to claim 10 for a heating period as a radiator as an evaporator, respectively at the time of air conditioning.
[Claim 22]
In a heat exchanger which performs heat exchange of a temperature control fluid and a heat carrier which flow through the exterior,
A heat carrier flow has the 1st turn and the 2nd turn at least between heat carrier induction and a heat carrier derivation part,
It has a core part formed by tube strings which made a tube arrange in parallel, a heat carrier collective part which gather said heat carrier which passed through said 1st turn, and a heat carrier distribution part which distributes said heat carrier to said 2nd turn,
It has tube strings of a single row which forms said 1st turn that said core part is a right-and-left near-full area, and flows into an opposite direction mutually, and said 2nd turn, or a double row,
Said heat carrier collective part has the structure of making right and left dividing a heat carrier of said 1st turn, and gathering,
Said heat carrier distribution part has the structure distributed so that said 2nd turn may be formed in another field in a longitudinal direction with said 1st turn,
Said heat carrier collective part and a heat carrier distribution part are connected via a communicating part of a couple,
A heat exchanger characterized by things.

[Translation done.]

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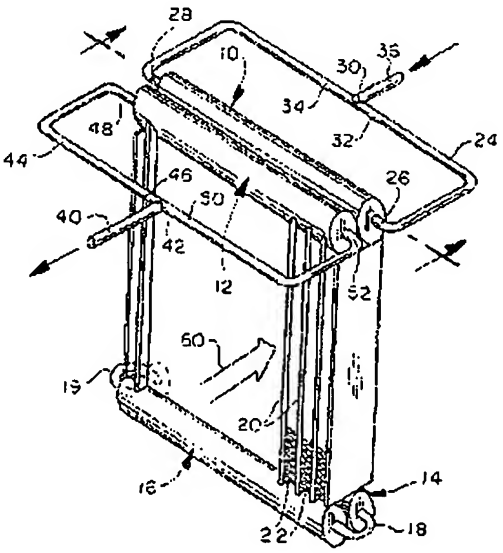
最終頁に続く

(54)【発明の名称】　蒸発器

(57)【要約】　（修正有）
【目的】改良された流れ回路を持つ冷媒蒸発器の提供。
【構成】上部入口ヘッダー１０と上部出口ヘッダー１２を同一平面上に隣接して並列配置し．更に中間下部ヘッダー１４，１６を配置し．ヘッダー１０とヘッダー１４．ヘッダー１６とヘッダー１２を各々複数の扁平管チューブ２０で連通すると共に、下部ヘッダー１４．１６を両端でＵベンド１８，１９で連通させる。蒸発されるべき流体を入口３６から２つに分けて上部入口ヘッダー１０の両端２６．２８より進入させ．ヘッダー内中央部で衝突させ運動エネルギー．運動量を散逸する２つの対向した流れとし各流路に対する該流体の分配の均一性を高め．下降し下部中間ヘッダー１４．Ｕベンド１８，１９．下部中間ヘッダー１６を経て上昇し、この間蒸発して上部出口ヘッダー１２に至り、ヘッダー１２の両端出口４８，５２より分れて流出し出口抵抗を減少させながら出口管４０より流出させる。



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【特許請求の範囲】

【請求項１】冷媒等のための蒸発器であって、

各々．一端と他端を有し．蒸発させるべき流体のための複数の並列流路を形成する手段と、

該各流路の一端のところに配置され．該各流路の一端に流体連通した細長い入口チャンネルを有する入口ヘッダーと．

前記各流路の他端のところに配置され．該各流路の他端に流体連通した出口ヘッダーとから成り、

前記入口チャンネルは、その両端に互いに対向した１対の入口を有しており、それによって．該両入口に流入してきた、蒸発させるべき流体が互いに衝突する２つの対向した流れとなり、前記各流路に対する該流体の分配の均一性を高めるようになされていることを特徴とする蒸発器。

【請求項２】前記入口ヘッダーは、管であり、前記入口チャンネルは．該管の内部によって画定されていることを特徴とする請求項１に記載の蒸発器。

【請求項３】前記管は、真直ぐな管であることを特徴とする請求項２に記載の蒸発器。

【請求項４】前記両入口は．前記管の内部に沿って総体的に軸線方向に向けられていることを特徴とする請求項２に記載の蒸発器。

【請求項５】複数の並列流路を形成する前記手段は、前記入口ヘッダーと出口ヘッダーの間に延設された複数の互いに離隔した管と、該離隔した管の間に介設されたフィンから成ることを特徴とする請求項１に記載の蒸発器。

【請求項６】複数の並列流路を形成する前記手段は、該各流路を熱交換領域を横切って多数回通す構成とされていることを特徴とする請求項１に記載の蒸発器。

【請求項７】冷媒等のための蒸発器であって、

各々．一端と他端を有し．蒸発させるべき流体のための複数の並列流路を形成する手段と、

該各流路の一端のところに配置され．該各流路の一端に流体連通した入口ヘッダーと、

前記各流路の他端のところに配置され．該各流路の他端に流体連通した細長い出口チャンネルを有する出口ヘッダーとから成り．

前記出口チャンネルは、その両端に互いに離れる方向に反対向きに向けられた１対の出口を有しており．それによって、該両出口から流出する流体が互いに散開する２つの流れとなって出口抵抗を減少させ．前記各流路に対する前記流体の分配の均一性を高めるようになされていることを特徴とする蒸発器。

【請求項８】冷凍系統に使用するための蒸発器であって．

互いに並列流れ関係に、互いに離隔して配列された複数の管と、

該複数の管の間に介設され該管に取付けられたフィン

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と．

該各管の内部に流体連通した細長いヘッダーとから成り．

該ヘッダーは．前記各管への流体の分配の均一性を高める２つの流れを創生するための互いに隔離した２つのポートを有していることを特徴とする蒸発器。

【請求項９】前記２つのポートを互いに接続する総体的にＣ字形の導管と、該導管に接続されたＴ継手を有し、蒸発させるべき流体を該Ｔ継手及びＣ字形の導管を通して該両ポートへ導入するようになされていることを特徴とする請求項８に記載の蒸発器。

【請求項１０】前記ヘッダーは、断面ほぼ円形の管であり．前記２つのポートは該管の対向した両端に互いに軸線方向にほぼ整列して配置されていることを特徴とする請求項９に記載の蒸発器。

【請求項１１】前記ヘッダーは、入口ヘッダーであり、前記２つのポートは、前記流体の前記２つの流れを衝突させてその運動エネルギーを散逸させるように．互いに対向して配置されていることを特徴とする請求項１０に記載の蒸発器。

【請求項１２】前記ヘッダーは、出口ヘッダーであり、前記２つのポートは、該ヘッダーから前記流体を２つの方向に流出させるように．互いに離れる方向に反対向きに向けられていることを特徴とする請求項１０に記載の蒸発器。

【請求項１３】冷凍系統に使用するための蒸発器であって．

両端に１つづつ互いに対面するポートを備えた細長いヘッダーと、

該２つのポートを互いに接続する共通導管と、

前記ヘッダーの長手に沿って互いに隔離して配列され、各々．該ヘッダー内に臨む開放端を有する複数の管と、から成る蒸発器。

【請求項１４】前記ヘッダーは、入口ヘッダーであり、前記２つのポートを通って該入口ヘッダーに流入した流体は．互いに衝突する２つの流れを創生することを特徴とする請求項１３に記載の蒸発器。

【請求項１５】前記ヘッダーは、出口ヘッダーであり、流体は、前記２つのポートを通って該ヘッダーから流出するようになされていることを特徴とする請求項１３に記載の蒸発器。

【請求項１６】冷凍系統に使用するための蒸発器であって．

両端に１つづつ互いに対面するポートを備えた細長い第１ヘッダーと．

前記第１ヘッダーの長手に沿って互いに離隔して配列され．各々、該第１ヘッダー内に臨む開放した一端を有する第１群の管と．

両端に１つづつ互いに対面するポートを備えた細長い第２ヘッダーと．

前記第2ヘッダーの長手に沿って互いに離隔して配列され．各々、該第2ヘッダー内に臨む開放した一端を有する第2群の管と．

それぞれ、第1ヘッダーの一方のポートと第2ヘッダーの一方のポートを互いに接続し、第1ヘッダーの他方のポートと第2ヘッダーの他方のポートを互いに接続する1対の共通導管と、から成る蒸発器。

【請求項17】両端に1つづつ互いに対面するポートを備えた入口ヘッダーと、該入口ヘッダーの2つのポートを互いに接続する共通導管を含み、前記第1群の管は、前記第1ヘッダーの長手に沿って互いに離隔して配列され．該各管の開放した他端は、該入口ヘッダー内に臨んでいることを特徴とする請求項16に記載の蒸発器。

【請求項18】両端に1つづつ互いに対面するポートを備えた出口ヘッダーと、該出口ヘッダーの2つのポートを互いに接続する共通導管を含み、前記第2群の管は、該第2ヘッダーの長手に沿って互いに離隔して配列され．該各管の開放した他端は、該出口ヘッダー内に臨んでいることを特徴とする請求項17に記載の蒸発器。

【請求項19】前記入口ヘッダーと出口ヘッダーとは互いに並置して配置され、前記第1ヘッダーと第2ヘッダーとは互いに並置して配置されており．前記1対の共通導管の一方は．第1ヘッダーと第2ヘッダーの互いに隣接する一端のポートを互いに接続し．該1対の共通導管の他方は、第1ヘッダーと第2ヘッダーの互いに隣接する他端のポートを互いに接続していることを特徴とする請求項18に記載の蒸発器。

【請求項20】冷凍系統に使用するための蒸発器であって．

細長い入口チャンネルを有する入口ヘッダーと．

該入口チャンネルに対して並置関係をなして配置された．細長い出口チャンネルを有する出口ヘッダーと、

互いに並置関係をなして配置されており、かつ．前記入口ヘッダー及び出口ヘッダーから離隔してそれらに平行に配置されており、各々．細長いチャンネルを有する第1及び第2中間ヘッダーと．

各々．前記入口チャンネルと前記第1中間ヘッダーのチャンネルに流体連通した第1列の管と．

各々．前記出口チャンネルと前記第2中間ヘッダーのチャンネルに流体連通した第2列の管とから成り．

前記入口チャンネルは、その対向した両端に1対の入口を有し、

前記出口チャンネルは、その対向した両端に1対の出口を有し、

前記第1中間ヘッダーのチャンネルは．その対向した両端に1対の出口を有し、

前記第2中間ヘッダーのチャンネルは．その対向した両端に1対の入口を有していることを特徴とする蒸発器。

【請求項21】前記入口チャンネルと出口チャンネルとは．互いに並置関係をなして配置されており、前記第1中間ヘッダーのチャンネルと第2中間ヘッダーのチャンネルとは、互いに並置関係をなして配置されていることを特徴とする請求項20に記載の蒸発器。

【請求項22】1対のU字管を含み．一方のU字管は、前記第1中間ヘッダーのチャンネルと第2中間ヘッダーのチャンネルの互いに隣接する一端を互いに接続し、他方のU字管は．第1中間ヘッダーのチャンネルと第2中間ヘッダーのチャンネルの互いに隣接する他端を互いに接続していることを特徴とする請求項21に記載の蒸発器。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、蒸発器に関し．特に、冷凍系統に使用すべき蒸発器のための改良された流れ回路に関する。

【0002】

【従来の技術】一般にはいろいろな熱交換操作のために任意の熱交換器構造を例えば油冷却器として、又はラジエータとして．又は凝縮器として、又は蒸発器として使用することができるという認識があるようであるが、それは正しくない場合が多い。特に一方の熱交換流体が熱交換操作中例えば液体から蒸気へ又は蒸気から液体へ相変化を受ける場合は、そのような認識が正しくない場合が多い。簡単にいえば、相変化は、多くの場合．熱交換操作の仕組みをかなり変化させる。冷凍系統に使用される蒸発器の場合は特にそうである。

【0003】冷凍系統においては、一方の熱交換流体（冷媒）は主として液相で蒸発器に向けて送られる。その熱交換流体は全部が液相である場合もあり、あるいは液体と蒸気の混合相である場合もある。いずれにしても．冷媒は、膨張弁又は毛管を通して蒸発器自体を含む低圧領域へ通される。膨張弁又は毛管の下流では．冷媒は混合相、即ち．冷媒液体と冷媒蒸気とから成っている。冷媒は、冷凍系統内を流れるので．冷媒の質量に関係する運動エネルギーを有する。もちろん、同じ容積の液相の冷媒と蒸気層の冷媒とでは、液相の冷媒の方が、密度がはるかに高いので運動エネルギー従って運動量が相当に大きい。従って、混合相の冷媒が蒸発器の複数の異なる流路へ冷媒を分配するためのマニホールド又はヘッダーに流入すると、しばしば、その流入する冷媒の液相成分の運動量により冷媒をマニホールドの全長の大部分あるいは全長に沿って急激に流動させ、マニホールドの一端に集中させてしまう傾向がある。従って．マニホールドの入口に近いところでマニホールドに連結された流路は、主として蒸気相の冷媒を受取り、マニホールドの入口から遠いところでマニホールドに連結された流路は．主として液相の冷媒を受取ることになる。蒸気相の冷媒はすでに蒸発潜熱を吸収してしまっているので、主として蒸気相の冷媒を通流させる流路は、該流路が吸収しうる熱の全部を吸収することができず、一方．主とし

て液相の冷媒を通流させる流路は、蒸発器の熱伝達の設計上の限界により、液相冷媒が吸収しうる熱の全部を吸収することができない。

【０００４】多数回通しの蒸発器においては、各１回の通し毎にその蒸発過程が上述した同じ要因によって影響される。加えて、出口抵抗（蒸発器の出口での流れに対する抵抗）も、各流路への冷媒分配の不均一の原因となる。いうまでもなく、これらの要因は、蒸発器の作動効率の低下をもたらすものである。

【０００５】

【発明が解決しようとする課題】本発明は、従来技術の上述した諸問題を克服することを課題とする。従って、本発明の目的は、新規な、改良された冷媒蒸発器を提供することであり、特に、冷媒蒸発器が優れた効率で作動することができるように蒸発器のための新規な、改良された流れ回路を提供することである。

【０００６】

【課題を解決するための手段】本発明は、その一側面によれば、上記課題を解決するために、冷媒等のための蒸発器において、各々、一端と他端を有し、蒸発させるべき流体のための複数の並列流路を形成する手段と、該各流路の一端のところに配置され、該各流路の一端に流体連通した細長いチャンネルを有するヘッダーとから成り、該ヘッダーは、その対向した両端に１対のポートを有していることを特徴とする蒸発器を提供する。

【０００７】好ましい実施例では、前記ヘッダーは、管によって構成され、前記チャンネルは、該管の内部によって画定される。ヘッダーを構成する管は、真直ぐな管であることが好ましい。一実施例においては、複数の並列流路を形成する前記手段は、入口ヘッダーと出口ヘッダーの間に延設された複数の互いに離隔した管と、該離隔した管の間に介設されたフィンによって構成する。又、複数の並列流路を形成する前記手段は、該各流路を熱交換領域を横切って多数回通す構成とすることもできる。

【０００８】本発明の特に好ましい実施例においては、互いに間隔をおいて並列流れ関係に配置され、間に介設されたフィンを有する複数の管と、該各管の一端のところに配置され、該各管の一端に流体連通した細長い入口チャンネルを有する入口ヘッダーとから成り、該入口チャンネルは、互いに衝突して運動エネルギーを散逸する２つの対向した流体の流れを創生するために、両端に互いに対向した１対の入口を有しており、それによって、前記各管への流体の分配の均一性を高めるようにした蒸発器が提供される。好ましい実施例では、上記入口ヘッダーから離隔させて出口ヘッダーを設け、該出口ヘッダーの細長い出口チャンネルに前記各管の他端を流体連通させる。この出口ヘッダーの出口チャンネルは、その両端に互いに離れる方向に反対向きに向けられた１対の出口を有し、それによって、該両出口から流出する流体が互いに敵対する２つの流れとなって出口抵抗を減少させ、該各管に対する流体の分配の均一性を更に高めるようにする。前記入口ヘッダーの入口チャンネルの１対の入口（ポート）を互いに接続するためにＣ字形の導管を設け、該Ｃ字導管にＴ継手を接続し、蒸発させるべき流体を該Ｔ継手及びＣ字導管を通して該入口へ導入するように構成するのが好ましい。同様に、出口ヘッダーの出口チャンネルの１対の出口（ポート）も、Ｃ字導管によって互いに接続し、そのＣ字導管にＴ継手を接続することができる。

【０００９】好ましい実施例では、蒸発させるべき流体を通すための２列又はそれ以上の管を配置し、第１列の管の第１端を入口ヘッダーに直接流体連通させ、第２列の管の第２端を出口ヘッダーに直接流体連通させる。２つ以上の中間ヘッダーを設け、入口ヘッダーに直接流体連通した第１列の管の第２端を第１中間ヘッダーに直接流体連通させ、出口ヘッダーに直接流体連通した第２列の管の第１端を第２中間ヘッダーに直接流体連通させる。第１中間ヘッダーの両端に互いに離れる方向に反対向きに向けられた１対の出口を設け、該両出口から流出する流体が互いに敵対する２つの流れとなって出口抵抗を減少させるようにする。第２中間ヘッダーの両端に互いに対向した１対の入口を設け、該両入口から流入した流体の２つの流れが衝突して運動エネルギーを散逸するようにする。第１中間ヘッダーと第２中間ヘッダーとは、互いに並置関係に配置し、第１中間ヘッダーの一端の出口と、第２中間ヘッダーの隣接する一端の入口を導管によって互いに接続し、第１中間ヘッダーの他端の出口と、第２中間ヘッダーの隣接する他端の入口を導管によって互いに接続する。

【００１０】

【実施例】図１を参照すると、本発明に従って構成された蒸発器の一実施例が示される。この蒸発器は、２回通し、向流／交差流式蒸発器であるが、本発明の原理は、１回通しの蒸発器にも、２回通し以上の多数回通しの蒸発器にも適用することができることは当業者には明らかであろう。図１に示されるように、この蒸発器は、いずれも円筒形であり、断面円形の管で形成された入口ヘッダー１０と出口ヘッダー１２を有している。入口ヘッダー１０を構成する管は、その内部に細長い入口チャンネルを画定する。出口ヘッダー１２を構成する管は、その内部に細長い出口チャンネルを画定する。蒸発器は、更に、入口ヘッダー１０及び出口ヘッダー１２と同様に互いに並置された１対の中間ヘッダー１４，１６を有している。中間ヘッダー１４，１６は、入口ヘッダー１０及び出口ヘッダー１２から離隔し、それぞれ入口ヘッダー１０及び出口ヘッダー１２に対して平行に配置されている。中間ヘッダー１４の内部と中間ヘッダー１６の内部の間には、その両端に設けられたＵ字管１８，１９によって流体連通が設定されている。好ましくは領用の扁平

管である複数の個別管２０が２列に配置されている（図１には１列だけが示されている）。これらの個別管２０は、蒸発すべき流体（冷媒）のための複数の並列流路を形成する。第１列の個別管（以下、単に「管」とも称する）２０は、入口ヘッダー１０と中間ヘッダー１４の間に延長し、両端においてそれぞれ入口ヘッダー１０及び中間ヘッダー１４の内部に連通している。同様に、第２列の管２０は、出口ヘッダー１２と中間ヘッダー１６の間に延長し、両端においてそれぞれ出口ヘッダー１２及び中間ヘッダー１６の内部に連通している。各列の管２０は、互いにりか牛ており、蛇行フィン２２のようなフィンが、周知の態様で隣接する管２０の間の間隙に配設され、各管に接合されている。

【００１１】Ｃ字導管２４の両端２６、２８が、入口ヘッダー１０の両端に接続され、該ヘッダーの内部に流体連通している。導管２４は、その両端２６と２８の中間にＴ継手３０を有することが好ましい。Ｔ継手３０の分岐管３２，３４はそれぞれ導管２４の両端２６、２８へ通じ、Ｔ継手３０の分岐管３６は、例えば、冷凍系統の圧縮機（図示せず）からの冷媒を凝縮させるための凝縮器（図示せず）に接続することができるようになされている。同様にして、Ｃ字導管４４の両端４８，５２が、出口ヘッダー１２の両端に接続され、該ヘッダーの内部に流体連通している。導管４４は、その両端４８と５２の中間にＴ継手４２を有する。Ｔ継手４２の分岐管４６、５０はそれぞれ導管４４の両端４８，５２へ通じ、Ｔ継手４２の分岐管４０は、例えば、冷凍系統の圧縮機に接続することができるようになされている。周知のように、冷凍系統の圧縮機は、通常、図１に示されるような蒸発器の出口ヘッダー１２から冷媒を蒸気相で受取る。

【００１２】作動において、冷媒は、導管２４を通して入口ヘッダー１０へ導入され、そこから対応する第１列の管２０を通って第１中間ヘッダー１４へ流れる。次いで、冷媒は、第１中間ヘッダー１４の両端からＵ字管１８、１９を経て第２中間ヘッダー１６へその両端から流入する。そこから冷媒は、第２列の管２０を通って上昇し出口ヘッダー１２へ流れ、出口ヘッダーから導管４４を通り、分岐管４０を経て凝縮器へ戻される。性能を最大限に発揮させるために、空気流は、図１に矢印６０で示される方向に冷媒の流れに対して交差流（十文字流）関係をなすように通される。即ち、個別管２０は、空気流が通される熱交換領域を横切って延長している。かくして、この蒸発器は、冷媒流と空気流とが交差関係をなす交差流特性を有する。更に、空気流のこの流れ方向からみれば、入口ヘッダー１０から第１列の個別管２０、中間ヘッダー１４，１６及び第２列の個別管２０を通って出口ヘッダー１２へ流れる冷媒の流れ方向は、蒸発器の背面から前面に向う方向であり、矢印６０で示されている空気流の方向に対して向流関係をなす。従って、この蒸発器は、交差流と向流の両方の特性を有する。

【００１３】図１では、入口ヘッダー及び出口ヘッダーは、構造を分かり易くするために円筒形の管とＣ字管から成るものとして示されているが、実際の応用例では、それらのヘッダー及びＣ字管を一体的に組合せた構造とすることができる。

【００１４】図２及び３を参照して説明すると、入口ヘッダー１０の端部６２，６４は、閉鎖されており、それぞれカップ形プラグ６６、６８によって密封されている。各プラグ６６，６８は、ヘッダー１０の長手軸線７４上にそれに沿う方向に中央開口即ちポート７０、７２を有している。Ｃ字導管２４の端部２６，２８は、それぞれプラグ６６、６８の外側面にそれぞれの開口７０，７２を覆って封着されている。かくして、Ｔ継手３０の分岐管３６への入来冷媒は、Ｃ字導管２４を通ってその端部２６，２８へ流れ、互いに対向した２つの流れ７８、８０として開口７０、７２を通して総体的に軸線方向に入口ヘッダー１０内へ導入される。各個別管２０は、図２，３にみられるように入口ヘッダー１０の長手方向に間隔をおいて配置されており、入口ヘッダー１０の内部に臨む開放端８４を有している。

【００１５】作動において、入来冷媒流れ７８、８０の液相成分は、系を通って流れる流れの運動量により、ヘッダー１０の長手軸線７４にほぼ沿う方向に向けられ、ヘッダー１０の内部で互いに衝突する。その結果、入来冷媒をヘッダー１０のどちらか一方の端部６２又は６４に片寄って集中させようとする運動エネルギーを分散させる。もし入口開口７０又は７２がヘッダー１０の端部６２、６４のどちらか一方にしか設けられていないとすれば、入来冷媒はヘッダー１０の入口開口が設けられていない方の端部に集中することになる。入来冷媒は、通常、若干の蒸気を含んでいるので、入来冷媒流れ７８と８０とは、ヘッダー１０の正確に中間点で衝突するのではなく、ヘッダーの全長の相当長い部分に亙って合流する。その結果、液相の冷媒がヘッダーの全長に亙って実質的に均一に分配され、蒸発器の一側から他側まで各個別管２０を通る冷媒の流れが均一になる。従って、蒸発器における上述した非効率の原因が実質的に軽減又は完全に除去される。

【００１６】冷媒の流れを最大限に均一にするために、中間ヘッダー１４と１６を連結するためにそれらの両端をＵ字管１８、１９で接続する構成を用いることができ、出口ヘッダー１２についても、入口ヘッダー１０の場合と同様に、ヘッダーの両端にＣ字導管４４を接続する構成を用いることができる。入口ヘッダーへの入口を両端に設けた本発明の構成によれば、入口ヘッダーへの入口が１つにされている従来の蒸発器に比べて約７～１０％の効率の向上が認められた。

【００１７】入口ヘッダー１０の作動の上述の説明は、第２中間ヘッダー１６にも当てはまる。即ち、第２中間

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ヘッダー16においても、2つの入来流れを互いに衝突させて該ヘッダーの全長に亙ってより均一に流体を分配させることができる。

【0018】出口ヘッダー12は、その両端にC字導管44の端部48、52へ通じる2つの出口を有している。かくして、出口ヘッダー12は、その両端からC字導管44の端部48，52へ冷媒を導出することにより冷媒流の出口抵抗を該ヘッダーの全長に亙ってより均一にする働きをする。第1中間ヘッダー14も、その両端にU字導管18、19へ通じる2つの出口を有しており、やはり、第1中間ヘッダー14も、その両端から冷媒を導出するので冷媒流の出口抵抗を該ヘッダーの全長に亙って均衡化する働きをする。第1中間ヘッダー14の各端からの冷媒は、それに隣接した第2中間ヘッダー16の各端へ導かれるので、両中間ヘッダーを結ぶ流路の長さが最短にされる。

【0019】

【発明の効果】系の全体効率は、両端に入口を有する入口ヘッダーと、両端に出口を有する出口ヘッダーと、両端において1対の接続管又はポートによって互いに連結された1対の中間ヘッダーとの組合せによって向上される。本発明の蒸発器は、液体と気体との間の摩擦力の差による問題を克服し、ヘッダーの全長に亙って流体をより均一に分配し、それによって各個別管への流体の分配の均一性を高める。又、最大限の効率を達成するために出口ヘッダー及び第1中間ヘッダーの両端に出口を設け＊

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＊ることにより各流路の流れ抵抗を均衡化する。

【0020】以上、本発明を実施例に関連して説明したが、本発明は、ここに例示した実施例の構造及び形態に限定されるものではなく、本発明の精神及び範囲から逸脱することなく、いろいろな実施形態が可能であり、いろいろな変更及び改変を加えることができることを理解されたい。

【図面の簡単な説明】

【図1】図1は、本発明による2回通しがた蒸発器の透視図である。

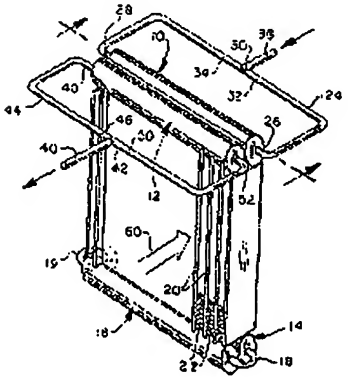
【図2】図2は、第1図の線2－2に沿ってみた入口ヘッダーの断面図である。

【図3】図3は、第2図の線3－3に沿ってみた入口ヘッダーの部分断面図である。

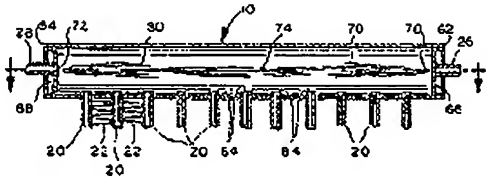
【符号の説明】

10：入口ヘッダー
12：出口ヘッダー
14、16：中間ヘッダー
18、19：U字管
20：個別管
22：フィン
24、44：C字導管
30、42：T継手
62、64：端部（入口）
70、72：開口（ポート）
84：閉放端

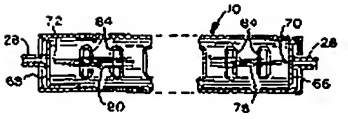
【図1】



【図2】



【図3】



フロントページの続き

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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1]A means to be an evaporator for a refrigerant etc., to have one end and the other end respectively, and to form two or more parallel channels for a fluid which should be evaporated, An inlet header which has the long and slender entrance channel which it has been arranged at a place of an end of each of this channel, and carried out fluid communicating to an end of each of this channel, It is arranged at a place of the other end of each of said channel, comprise an exit header which carried out fluid communicating to the other end of each of this channel, and said entrance channel, An evaporator which becoming two flowing [which have one pair of entrances which countered the both ends mutually, and have flowed into these both entrances by it / with which a fluid which should be evaporated collides mutually / which countered], and making as [improve / the homogeneity of distribution of this fluid to said each channel].
[Claim 2]The evaporator according to claim 1 which said inlet header is a pipe and is characterized by demarcating said entrance channel by an inside of this pipe.
[Claim 3]The evaporator according to claim 2, wherein said pipe is a straight pipe.
[Claim 4]The evaporator according to claim 2, wherein said both entrances are turned to an axial direction on the whole along with an inside of said pipe.
[Claim 5]The evaporator according to claim 1, wherein said means to form two or more parallel channels comprises a fin interposed between said inlet header, a pipe which were installed between exit headers, and which was isolated mutually [plurality], and a this isolated pipe.
[Claim 6]The evaporator according to claim 1, wherein said means to form two or more parallel channels is considered as composition which crosses a heat exchange field and lets this each channel pass many times.
[Claim 7]An evaporator characterized by comprising the following for a refrigerant etc.
A means to have one end and the other end and to form respectively two or more parallel channels for a fluid which should be evaporated.
An inlet header which it has been arranged at a place of an end of each of this channel, and carried out fluid communicating to an end of each of this channel.
A long and slender exit channel which it has been arranged at a place of the other end of each of said channel, and carried out fluid communicating to the other end of each of this channel.

[Claim 8]Two or more pipes which were the evaporators for using it for a frozen system, were mutually isolated in parallel flow relations and were arranged, An evaporator, wherein it comprises a fin which was interposed between pipes of this plurality and attached to this pipe, and a long and slender header which carried out fluid communicating to an inside of this each pipe and this header has two ports isolated mutually for creating two flows which improve the homogeneity of distribution of a fluid to said each pipe.
[Claim 9]The evaporator according to claim 8 which has T jointing which connects said two ports mutually, and which was connected to a lead pipe and this lead pipe of C type on the whole, and is

characterized by being made as [introduce / a fluid which should be evaporated / to these both ports / through a lead pipe of this T jointing and C type].
[Claim 10]The evaporator according to claim 9 which said header is a pipe of a section **** round shape, and is characterized by said two ports' aligning mostly to both ends to which this pipe countered, and arranging them mutually to them at an axial direction.
[Claim 11]The evaporator according to claim 10 which said header is an inlet header and is characterized by countering mutually and arranging said two ports so that said two flows of said fluid may be made to collide and the kinetic energy may be made to dissipate.
[Claim 12]The evaporator according to claim 10 which said header is an exit header and is characterized by turning said two ports in the direction which separates mutually for opposite so that said fluid may be made to flow out of this header in the two directions.
[Claim 13]A long and slender header provided with a port which is an evaporator for using it for a frozen system, and meets one both ends at a time mutually, A common lead pipe which connects this 2 ** port mutually, two or more pipes which are isolated mutually, are arranged along with the straight side of said header, and have respectively an open end which faces in this header, and **********.
[Claim 14]The evaporator according to claim 13 which said header is an inlet header and is characterized by a fluid which flowed into this inlet header through said two ports creating two flows which collide mutually.
[Claim 15]The evaporator according to claim 13 which said header is an exit header and is characterized by making a fluid as [flow / out of this header / through said two ports].
[Claim 16]An evaporator characterized by comprising the following for using it for a frozen system. The 1st long and slender header provided with a port which meets one both ends at a time mutually. A pipe of the 1st group that is isolated mutually, is arranged along with the straight side of said 1st header, and has respectively the end which faces in this 1st header, and which was opened wide. The 2nd long and slender header provided with a port which meets one both ends at a time mutually. An end which it is isolated mutually, is arranged along with the straight side of said 2nd header, and faces in this 2nd header respectively and which was opened wide.

[Claim 17]Two ports, an inlet header provided with a port which meets one both ends at a time mutually, and this inlet header, including a common lead pipe connected mutually a pipe of said 1st group, The evaporator according to claim 16 having faced the other end which it was isolated mutually, and was arranged along with the straight side of said 1st header, and this each pipe opened in this inlet header.
[Claim 18]Two ports, an exit header provided with a port which meets one both ends at a time mutually, and this exit header, including a common lead pipe connected mutually a pipe of said 2nd group, The evaporator according to claim 17 having faced the other end which it was isolated mutually, and was arranged along with the straight side of this 2nd header, and this each pipe opened in this exit header.
[Claim 19]Juxtapose said inlet header and exit header of each other, and are arranged, and juxtapose said 1st header and the 2nd header of each other, and it is arranged, and one side of one pair of said common lead pipes, The evaporator according to claim 18, wherein it connected mutually a port of one end where the 1st header and the 2nd header adjoin mutually and another side of this 1 pair common lead pipe has connected mutually a port of the other end where the 1st header and the 2nd header adjoin mutually.
[Claim 20]An inlet header which is an evaporator for using it for a frozen system, and has a long and slender entrance channel, An exit header which made juxtaposition relations and has been arranged to this entrance channel and which has a long and slender exit channel, The 1st and 2nd intermediate headers that make juxtaposition relations mutually, are arranged, and are isolated from said inlet header and an exit header, are arranged in parallel with them, and have a long and slender

channel respectively, A pipe of the 1st row which carried out fluid communicating to said entrance channel and a channel of said 1st intermediate header respectively, Comprise respectively a pipe of the 2nd row which carried out fluid communicating to said exit channel and a channel of said 2nd intermediate header, and said entrance channel, Have one pair of entrances to the both ends which countered, and said exit channel, An evaporator, wherein it has one pair of exits to the both ends which countered, a channel of said 1st intermediate header has one pair of exits to the both ends which countered and a channel of said 2nd intermediate header has one pair of entrances to the both ends which countered.

[Claim 21]The evaporator according to claim 20, wherein said entrance channel and an exit channel make juxtaposition relations mutually, and are arranged, and a channel of said 1st intermediate header and a channel of the 2nd intermediate header make juxtaposition relations mutually and are arranged.

[Claim 22]One U tube connects mutually including one pair of U tubes, and an end which a channel of said 1st intermediate header and a channel of the 2nd intermediate header adjoin mutually a U tube of another side, The evaporator according to claim 21 having connected the other end of each other which a channel of the 1st intermediate header and a channel of the 2nd intermediate header adjoin mutually.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]Especially this invention relates to the flow circuit where it was improved for the evaporator which should be used for a frozen system about an evaporator.
[0002]
[Description of the Prior Art]Although it seems that there is generally recognition that it can be used as a radiator or a condenser or an evaporator, by making heat exchanger structures arbitrary for various heat exchange operations into an oil cooler, it is not right in many cases. When the heat exchanging fluid which is especially one side receives a phase change from a steam to a steam or a fluid out of heat exchange operation (for example, a fluid), such recognition is not right in many cases. If it says simply, in many cases, a phase change will change the structure of heat exchange operation considerably. Especially in the case of the evaporator used for a frozen system, that is right.
[0003]In a frozen system, one heat exchanging fluid (refrigerant) is mainly sent towards an evaporator by the liquid phase. All may be the liquid phase or the heat exchanging fluid may be a compound phase of a fluid and a steam. Anyway, it lets a refrigerant pass to the low pressure region which contains the evaporator itself through an expansion valve or a capillary tube. Downstream from the expansion valve or the capillary tube, the refrigerant comprises the compound phase, i.e., a refrigerant solution object and refrigerant vapor. Since a refrigerant flows through the inside of a frozen system, it has the kinetic energy related to the mass of a refrigerant. Of course, since the refrigerant of the liquid phase is far more expensive, kinetic energy, therefore quantity of motion are fairly large at the same refrigerant of the liquid phase of capacity and refrigerant of a vapor layer. Therefore, when it flows into a manifold or a header for the refrigerant of a compound phase to distribute a refrigerant to a different channel of the plurality of an evaporator, often, There is a tendency which a refrigerant is made to flow rapidly along with most overall lengths or the overall length of a manifold with the quantity of motion of the liquid phase component of the flowing refrigerant, and is centralized on the end of a manifold. Therefore, the channel connected with the manifold in the place near the entrance of a manifold will mainly receive the refrigerant of a vapor phase, and the channel connected with the manifold in the place distant from the entrance of a manifold will mainly receive the refrigerant of the liquid phase. Since the refrigerant of a vapor phase has already absorbed the latent heat of vaporization, the channel which mainly carries out conduction of the refrigerant of a vapor phase, On the other hand, the channel which mainly carries out conduction of the refrigerant of the liquid phase cannot absorb all of the heat which a liquid phase refrigerant may absorb according to the design limit of heat transfer of an evaporator by the ability not to absorb all of the heat which this channel may absorb.
[0004]In a many times through evaporator, it is influenced by the same factor that the vaporizing process mentioned above for through [1 time each of / every]. In addition, exit resistance

(resistance to the flow in the exit of an evaporator) also becomes an uneven cause of the refrigerant distribution to each channel. Needless to say, these factors bring about decline in the operating efficiency of an evaporator.
[0005]
[Problem(s) to be Solved by the Invention]This invention makes it a technical problem to conquer many problems which conventional technology mentioned above. Therefore, the purpose of this invention is a new thing for which the improved refrigerant evaporator is provided, and is providing the improved flow circuit new [for an evaporator] so that it can operate at the efficiency in which the refrigerant evaporator was excellent especially.
[0006]
[Means for Solving the Problem]In order that this header may solve an aforementioned problem by this invention comprising a header according to the one side face which is characterized by that an evaporator having one pair of ports to the both ends which countered comprises the following, it is an evaporator for a refrigerant etc.
A means to have one end and the other end and to form respectively two or more parallel channels for a fluid which should be evaporated.
A long and slender channel which it has been arranged at a place of an end of each of this channel, and carried out fluid communicating to an end of each of this channel.

[0007]In a desirable example, said header is constituted by pipe and said channel is demarcated by an inside of this pipe. As for a pipe which constitutes a header, it is preferred that it is a straight pipe. In one example, a fin interposed between an inlet header, a pipe which were installed between exit headers, and which was isolated mutually [plurality], and a this isolated pipe constitutes said means to form two or more parallel channels. Said means to form two or more parallel channels can also be considered as composition which crosses a heat exchange field and lets this each channel pass many times.
[0008]Two or more pipes which have the fin which set an interval mutually, has been arranged in a desirable example of this invention at parallel flow relations, and was interposed especially in between, It is arranged at a place of an end of each of this pipe, comprise an inlet header which has the long and slender entrance channel which carried out fluid communicating to an end of each of this pipe, and this entrance channel, In order to create a flow of two fluids which collides mutually and dissipate kinetic energy and which countered, it has one pair of entrances which countered both ends mutually, and an evaporator which improved the homogeneity of distribution of a fluid to said each pipe by it is provided. In a desirable example, you make it isolated from the above-mentioned inlet header, an exit header is provided, and fluid communicating of the other end of each of said pipe is carried out to an exit channel with this long and slender exit header. Have an exit channel of this exit header and one pair of exits turned for opposite in the direction which separates mutually to those both ends by it. A fluid which flows out of these both exits becomes two flows which deploy mutually, decreases exit resistance, and improves further the homogeneity of distribution of a fluid to this each pipe. It is preferred to constitute so that a lead pipe of C type may be provided in order to connect mutually one pair of entrances (port) of an entrance channel of said inlet header, T jointing may be connected to this C character lead pipe and a fluid which should be evaporated may be introduced to this entrance through this T jointing and a C character lead pipe. the same -- one pair of exits (port) of an exit channel of an exit header -- C character -- connecting mutually with a lead pipe -- the C character -- T jointing is connectable with a lead pipe.
[0009]In a desirable example, a pipe beyond two rows or it for letting a fluid which should be evaporated pass is arranged, fluid communicating of the 1st end of a pipe of the 1st row is directly carried out to an inlet header, and fluid communicating of the 2nd end of a pipe of the 2nd row is directly carried out to an exit header. Two or more intermediate headers are provided, fluid communicating of the 2nd end of a pipe of the 1st row which carried out fluid communicating to an

inlet header directly is directly carried out to the 1st intermediate header, and fluid communicating of the 1st end of a pipe of the 2nd row which carried out fluid communicating to an exit header directly is directly carried out to the 2nd intermediate header. One pair of exits turned in the direction which separates mutually to both ends of the 1st intermediate header for opposite are provided, a fluid which flows out of these both exits becomes two flows which deploy mutually, and it is made to decrease exit resistance. One pair of entrances which countered mutually are established in both ends of the 2nd intermediate header, two flows of a fluid which flowed from these both entrances collide, and kinetic energy is made to dissipate. The 1st intermediate header and the 2nd intermediate header arrange them in juxtaposition relations mutually, and An exit of an end of the 1st intermediate header, An entrance of one end where the 2nd intermediate header adjoins is mutually connected with a lead pipe, and an exit of the other end of the 1st intermediate header and an entrance of the other end where the 2nd intermediate header adjoins are mutually connected with a lead pipe.

[0010]

[Example]Reference of drawing 1 will show one example of the evaporator constituted according to this invention. Although this evaporator is 2 times through, and a counterflow / cross-flows type evaporator, probably, it will be clear to a person skilled in the art that the principle's of this invention it is applicable also to the many times through evaporator more than 2 times through also at a 1 time through evaporator. As shown in drawing 1, each of this evaporator is a cylindrical shape. It has the inlet header 10 and the exit header 12 which were formed with the pipe of the round cross section.

The pipe which constitutes the inlet header 10 demarcates a long and slender entrance channel to the inside. The pipe which constitutes the exit header 12 demarcates a long and slender exit channel to the inside. The evaporator has further the inlet header 10 and the exit header 12, and one pair of intermediate headers 14 and 16 juxtaposed mutually in a similar manner. The intermediate headers 14 and 16 are isolated from the inlet header 10 and the exit header 12, and are arranged in parallel to the inlet header 10 and the exit header 12, respectively. Between the insides of the intermediate header 14 and the intermediate header 16, fluid communicating is set up by U tubes 18 and 19 formed in the both ends. Two or more individual pipes 20 which are conventional flat tubes preferably are arranged at two rows (only one row is shown in drawing 1). These individual pipes 20 form two or more parallel channels for the fluid (refrigerant) which should evaporate. The individual pipe (it is also only hereafter called a "pipe") 20 of the 1st row is extended between the inlet header 10 and the intermediate header 14, and is open for free passage inside the inlet header 10 and the intermediate header 14 in both ends, respectively. Similarly, the pipe 20 of the 2nd row is extended between the exit header 12 and the intermediate header 16, and is open for free passage inside the exit header 12 and the intermediate header 16 in both ends, respectively. The pipe 20 of each sequence is the Rika ********** mutually.

A fin like the fin 22 is allocated in the gap between the pipes 20 which adjoin in a well-known mode, and is joined to each pipe.

[0011]It is connected to the both ends of the inlet header 10, and the both ends 26 and 28 of the lead pipe 24 are carrying out fluid communicating of the C characters to the inside of this header. As for the lead pipe 24, it is preferred to have T jointing 30 in the middle of the both ends 26 and 28. The branch pipes 32 and 34 of T jointing 30 are made as [connect /, for example / through the both ends 26 and 28 of the lead pipe 24 / the branch pipe 36 of T jointing 30 / to the condenser (not shown) for making the refrigerant from the compressor (not shown) of a frozen system condense /, respectively]. Similarly, it is connected to the both ends of the exit header 12, and the both ends 48 and 52 of the lead pipe 44 are carrying out fluid communicating of the C characters to the inside of this header. The lead pipe 44 has T jointing 42 in the middle of the both ends 48 and 52. The branch pipes 46 and 50 of T jointing 42 are made through the both ends 48 and 52 of the

lead pipe 44 as [connect / the branch pipe 40 of T jointing 42 / to the compressor of a frozen system /, for example], respectively. As everyone knows, the compressor of a frozen system usually receives a refrigerant from the exit header 12 of an evaporator as shown in drawing 1 by a vapor phase.

[0012]In an operation, a refrigerant is introduced through the lead pipe 24 to the inlet header 10, and flows into the 1st intermediate header 14 through the pipe 20 of the 1st row corresponding from there. Subsequently, a refrigerant flows into the 2nd intermediate header 16 from the both ends through U tubes 18 and 19 from the both ends of the 1st intermediate header 14. A refrigerant goes up through the pipe 20 of the 2nd row from there, and it flows into the exit header 12, passes along the lead pipe 44 from an exit header, and is returned to a condenser through the branch pipe 40. In order to demonstrate performance to the maximum extent, it lets airstream pass so that cross-flows (cross style) relations may be made to the flow of a refrigerant in the direction shown in drawing 1 by the arrow 60. That is, the individual pipe 20 has crossed and extended the heat exchange field where it lets airstream pass. In this way, this evaporator has the cross-flows characteristic that a refrigerant stream and airstream make intersection relations. If it sees from this flow direction of airstream, the flow direction of a refrigerant through which it flows into the exit header 12 through the individual pipe 20 of the 1st row, the intermediate headers 14 and 16, and the individual pipe 20 of the 2nd row from the inlet header 10 will be the direction of the other side from the back of an evaporator to a front face.

Counterflow relations are made to the direction of the airstream shown by the arrow 60.

Therefore, this evaporator has the characteristic of both cross flows and a counterflow.

[0013]At drawing 1, the inlet header and the exit header are shown as what comprises the pipe and C character pipe of a cylindrical shape, in order to make structure intelligible, but they can be made into the structure which combined those headers and C character pipe in one by a actual application.

[0014]If it explains with reference to drawing 2 and 3, the ends 62 and 64 of the inlet header 10 are closed.

It is sealed by the cup shape plugs 66 and 68, respectively.

Each plugs 66 and 68 have the central opening 70 and 72, i.e., ports, in the direction which meets on the longitudinal axis 74 of the header 10 at it. C characters, the ends 26 and 28 of the lead pipe 24 cover each opening 70 and 72 to the lateral surface of the plugs 66 and 68, and are sealed, respectively. In this way, the ingress refrigerant of C characters to the branch pipe 36 of T jointing 30 flows into the ends 26 and 28 through the lead pipe 24, and is introduced into an axial direction into the inlet header 10 on the whole through the openings 70 and 72 as the two flows 78 and 80 which countered mutually. An interval is set to the longitudinal direction of the entrance header 10, and the pipe 20 according to each is arranged at it, as seen in drawing 2 and 3.

It has the open end 84 which attends the inside of the inlet header 10.

[0015]In an operation, with the quantity of motion of the flow which flows through a system, the liquid phase component of the ingress refrigerant flows 78 and 80 is turned in the direction which meets the longitudinal axis 74 of the header 10 mostly, and collides mutually inside the header 10. As a result, the kinetic energy on which it is going to incline toward one of the ends 62 of the header 10 or 64, and is going to centralize an ingress refrigerant is distributed. If the inlet opening 70 or 72 is provided only in one of the ends 62 and 64 of the header 10, an ingress refrigerant will be concentrated on the end of the direction in which the inlet opening of the header 10 is not provided. Since the ingress refrigerant contains some steam, the long portion with a considerable overall length of a header of the header 10 which does not collide in the halfway point correctly is covered, and the ingress refrigerant flows 78 and 80 usually join it. As a result, the refrigerant of the liquid phase covers the overall length of a header, and is distributed uniformly substantially, and the flow of the refrigerant which passes along the pipe 20 according to each in other sides from the 1 side of

an evaporator becomes uniform. Therefore, the inefficient cause in an evaporator mentioned above is substantially removed by mitigation or completeness.

[0016]In order to make the flow of a refrigerant uniform to the maximum extent, in order to connect the intermediate headers 14 and 16, can use the composition which connects those both ends with U tubes 18 and 19, and also about the exit header 12. The composition which connects the lead pipe 44 of C characters can be used for the both ends of a header like the case of the inlet header 10. According to the composition of this invention which established the entrance to the inlet header in both ends, compared with the conventional evaporator with which the entrance to the inlet header is set to one, improvement in the efficiency of about 7 to 10% was accepted.

[0017]The above-mentioned explanation of an operation of the inlet header 10 is applied also to the 2nd intermediate header 16. That is, two ingress flows can be made to be able to collide mutually, the overall length of this header can be covered, and a fluid can be made to distribute to homogeneity more also in the 2nd intermediate header 16.

[0018]The exit header 12 has two exits which lead to the ends 48 and 52 of the lead pipe 44 C characters to the both ends. In this way, the exit header 12 serves to cover the overall length of this header and to make exit resistance of a refrigerant stream homogeneity more by deriving the refrigerant of C characters from the both ends to the ends 48 and 52 of the lead pipe 44. It has two exits which lead to the lead pipes 18 and 19 U characters to the both ends, and too, since the 1st intermediate header 14 also derives a refrigerant from the both ends, the 1st intermediate header 14 also serves to cover the overall length of this header and to carry out balancing of the exit resistance of a refrigerant stream. Since the refrigerant from each end of the 1st intermediate header 14 is led to each end of the 2nd intermediate header 16 that adjoined it, the length of the channel to which both intermediate headers are connected is made into the shortest.

[0019]

[Effect of the Invention]The overall efficiency of a system improves with the combination of the inlet header which has an entrance to both ends, the exit header which has an exit to both ends, and one pair of intermediate headers mutually connected by one pair of communication trunks, or the port in both ends. The evaporator of this invention conquers the problem by the difference of the frictional force between a fluid and a gas, covers the overall length of a header, distributes a fluid to homogeneity more, and improves the homogeneity of distribution of the fluid to the pipe according to each by it. In order to attain the maximum efficiency, balancing of the flow resistance of each channel is carried out by establishing an exit in the both ends of an exit header and the 1st intermediate header.

[0020]As mentioned above, although this invention was explained in relation to the example, this invention should understand that various embodiments are possible and various change and changes can be added, without not being limited to the structure and the gestalt of an example which were illustrated here, and deviating from the pneuma and the range of this invention.

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TECHNICAL FIELD

[Industrial Application]Especially this invention relates to the flow circuit where it was improved for the evaporator which should be used for a frozen system about an evaporator.

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PRIOR ART

[Description of the Prior Art]Although it seems that there is generally recognition that it can be used as a radiator or a condenser or an evaporator, by making heat exchanger structures arbitrary for various heat exchange operations into an oil cooler, it is not right in many cases. When the heat exchanging fluid which is especially one side receives a phase change from a steam to a steam or a fluid out of heat exchange operation (for example, a fluid), such recognition is not right in many cases. If it says simply, in many cases, a phase change will change the structure of heat exchange operation considerably. Especially in the case of the evaporator used for a frozen system, that is right.
[0003]In a frozen system, one heat exchanging fluid (refrigerant) is mainly sent towards an evaporator by the liquid phase. All may be the liquid phase or the heat exchanging fluid may be a compound phase of a fluid and a steam. Anyway, it lets a refrigerant pass to the low pressure region which contains the evaporator itself through an expansion valve or a capillary tube. Downstream from the expansion valve or the capillary tube, the refrigerant comprises the compound phase, i.e., a refrigerant solution object and refrigerant vapor. Since a refrigerant flows through the inside of a frozen system, it has the kinetic energy related to the mass of a refrigerant. Of course, since the refrigerant of the liquid phase is far more expensive, kinetic energy, therefore quantity of motion are fairly large at the same refrigerant of the liquid phase of capacity and refrigerant of a vapor layer. Therefore, when it flows into a manifold or a header for the refrigerant of a compound phase to distribute a refrigerant to a different channel of the plurality of an evaporator, often, There is a tendency which a refrigerant is made to flow rapidly along with most overall lengths or the overall length of a manifold with the quantity of motion of the liquid phase component of the flowing refrigerant, and is centralized on the end of a manifold. Therefore, the channel connected with the manifold in the place near the entrance of a manifold will mainly receive the refrigerant of a vapor phase, and the channel connected with the manifold in the place distant from the entrance of a manifold will mainly receive the refrigerant of the liquid phase. Since the refrigerant of a vapor phase has already absorbed the latent heat of vaporization, the channel which mainly carries out conduction of the refrigerant of a vapor phase, On the other hand, the channel which mainly carries out conduction of the refrigerant of the liquid phase cannot absorb all of the heat which a liquid phase refrigerant may absorb according to the design limit of heat transfer of an evaporator by the ability not to absorb all of the heat which this channel may absorb.
[0004]In a many times through evaporator, it is influenced by the same factor that the vaporizing process mentioned above for through [1 time each of / every]. In addition, exit resistance (resistance to the flow in the exit of an evaporator) also becomes an uneven cause of the refrigerant distribution to each channel. Needless to say, these factors bring about decline in the operating efficiency of an evaporator.

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EFFECT OF THE INVENTION

[Effect of the Invention]The overall efficiency of a system improves with the combination of the inlet header which has an entrance to both ends, the exit header which has an exit to both ends, and one pair of intermediate headers mutually connected by one pair of communication trunks, or the port in both ends. The evaporator of this invention conquers the problem by the difference of the frictional force between a fluid and a gas, covers the overall length of a header, distributes a fluid to homogeneity more, and improves the homogeneity of distribution of the fluid to the pipe according to each by it. In order to attain the maximum efficiency, balancing of the flow resistance of each channel is carried out by establishing an exit in the both ends of an exit header and the 1st intermediate header.
[0020]As mentioned above, although this invention was explained in relation to the example, this invention should understand that various embodiments are possible and various change and changes can be added, without not being limited to the structure and the gestalt of an example which were illustrated here, and deviating from the pneuma and the range of this invention.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]Drawing 1 is a perspective diagram of the 2 times through evaporator by this invention.
[Drawing 2]Drawing 2 is the sectional view of an inlet header which met the line 2-2 of Drawing 1.
[Drawing 3]Drawing 3 is the fragmentary sectional view of an inlet header which met the line 3-3 of Drawing 2.
[Description of Notations]
10: Inlet header
12: Exit header
14, 16: Intermediate header
18, 19: U tube
20: Individual pipe
22: Fin
24, a 44:C character lead pipe
30, 42: T jointing
62, 64: End (entrance)
70, 72: Opening (port)
84: Open end

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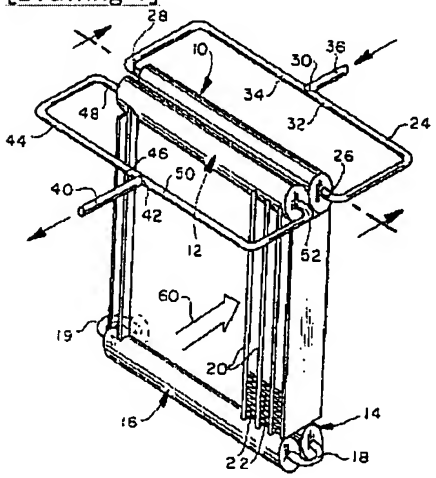
DRAWINGS

[Drawing 1]



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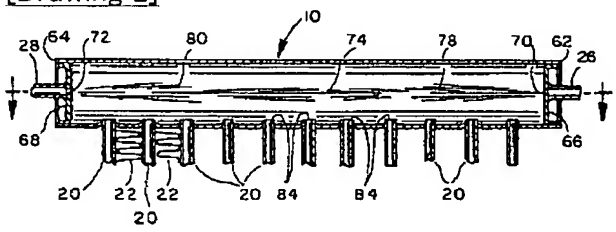

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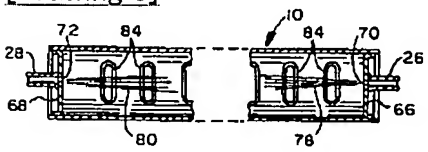

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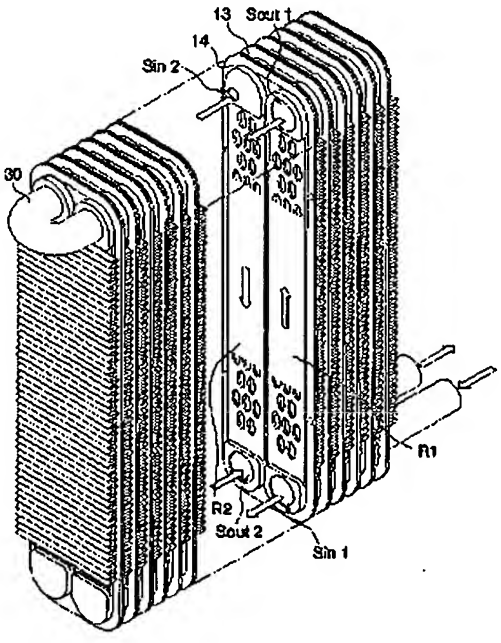
(54)【発明の名称】　熱交換器

(57)【要約】
【課題】　冷媒を各冷媒流路に均一に分配することで熱交換性能の向上を図ることができる2ブロック仕様の熱交換器を提供することを目的としている。
【解決手段】　2ブロック仕様の熱交換器であって、冷媒流通部は、各々独立して冷媒が流通する2つの冷媒流路R1，R2と、これら冷媒流路R1、R2のそれぞれの両端に設けられた開口部を備え、二つの冷媒流路R1、R2のうち、一方の冷媒流路R1の一開口部によって形成される出口側空間（冷媒流動空間）Sout1の開口端は、他方の冷媒流路R2の一開口部によって形成される入口側空間（冷媒流動空間）Sin2の開口端と接続され、冷媒を各冷媒流通部の冷媒流路R1に流動させた後、各冷媒流通部の冷媒流路R2に冷媒を流す。



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【特許請求の範囲】

【請求項１】　絞り加工を施された２枚の平板が重ね合わされて内部に冷媒流路が設けられたプレート状の冷媒流通部と冷却フィンとが交互に積層されて構成され、前記２枚の平板には前記冷媒流路に開口する開口部がそれぞれ形成され、さらに積層されて隣り合う冷媒流通部の開口部どうしを突き合わされて連続した冷媒流動空間が形成された２ブロック仕様の熱交換器であって、

前記冷媒流通部は、各々独立して冷媒が流通する２つの冷媒流路と、これら冷媒流路のそれぞれの両端に設けられた前記開口部とを備え、

前記各冷媒流動空間の一端は閉塞されている閉塞端であり他端は開口している開口端であって、前記二つの冷媒流路のうち、一方の冷媒流路の一開口部によって形成される前記冷媒流動空間の開口端は、他方の冷媒流路の一開口部によって形成される前記冷媒流動空間の開口端と接続されていることを特徴とする熱交換器。

【請求項２】　請求項１に記載の熱交換器において、前記冷媒流動空間の少なくとも一つには、前記冷媒流路に供給される冷媒量を調節する冷媒分配手段が設けられていることを特徴とする熱交換器。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は空気調和装置などに設けられる熱交換器に関する。

【０００２】

【従来の技術】車両用空気調和装置などにエバポレータ（蒸発器）として使用される２ブロック仕様の熱交換器の構造の一例を図９に示す。図に示す熱交換器はドロンカップタイプと呼ばれるもので、絞り加工を施された矩形状の平板１、２を重ね合わせたプレート状の冷媒流通部３と波形に屈曲された冷却フィン４とが交互に積層されて構成されたものである。

【０００３】冷媒流通部３の内部には、平板１、２の外周部及び中央部がロウ付けされることで、上部に設けられた冷媒入口５から下部を往復し冷媒入口５と並んで上部に設けられた冷媒出口６に抜けるＵ字型の冷媒流路Ｒが形成されている。

【０００４】この熱交換器では、冷媒は冷媒入口５において各冷媒流通部３に分配され、冷媒流路Ｒを流通する過程で蒸発気化され、冷媒出口６において再び合流して熱交換器から流出するようになっている。

【０００５】

【発明が解決しようとする課題】ところで、上記のような構造の熱交換器には次のような問題点が指摘されている。すなわち、図１０に示すように、冷媒入口５が積層されることによって形成された連続した空間（以下、タンクと呼ぶ。）Ｔが形成されており、熱交換器に流入した冷媒はこの連続した空間を図中の矢印方向に進む過程で各冷媒流通部３に分配されるようになっている。しかしながら、従来の熱交換器では、タンクＴに供給された冷媒はタンクＴの奥まで届きにくく上流側の冷媒流路Ｒに多く流れる傾向にあり、タンクＴの下流側では冷媒の流れが滞ってしまう場合があった。このため、各冷媒流通部３への冷媒の分配が均一に行われなくなり、タンクＴの下流側に位置する冷媒流路Ｒでは過熱状態となって熱交換が十分に行われなくなっているという問題があった。

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【０００６】本発明は上記事情に鑑みて成されたものであり、冷媒を冷媒流路に均一に分配することで熱交換性能の向上を図ることができる熱交換器を提供することを目的としている。

【０００７】

【課題を解決するための手段】請求項１に記載の発明は、絞り加工を施された２枚の平板が重ね合わされて内部に冷媒流路が設けられたプレート状の冷媒流通部と冷却フィンとが交互に積層されて構成され、前記２枚の平板には前記冷媒流路に開口する開口部がそれぞれ形成され、さらに積層されて隣り合う冷媒流通部の開口部どうしを突き合わされて連続した冷媒流動空間が形成された２ブロック仕様の熱交換器であって、前記冷媒流通部は、各々独立して冷媒が流通する２つの冷媒流路と、これら冷媒流路のそれぞれの両端に設けられた前記開口部とを備え、前記各冷媒流動空間の一端は閉塞されている閉塞端であり他端は開口している開口端であって、前記二つの冷媒流路のうち、一方の冷媒流路の一開口部によって形成される前記冷媒流動空間の開口端は、他方の冷媒流路の一開口部によって形成される前記冷媒流動空間の開口端と接続されていることを特徴とする。

【０００８】本発明は、各冷媒流通部が２列の冷媒流路を有する２ブロック仕様の熱交換器において、一つの冷媒流路を通過した冷媒は、一旦冷媒流動空間に流れ出て、その後、再び他の冷媒流路を流通する。このように冷媒が２つの冷媒流路を片側ずつ流れるので、冷媒の滞りが防止され、過熱が発生しにくい。

【０００９】請求項２に記載の発明は、請求項１に記載の熱交換器において、前記冷媒流動空間の少なくとも一つには、前記冷媒流路に供給される冷媒量を調節する冷媒分配手段が設けられていることを特徴とする。

【００１０】この熱交換器においては、各冷媒流路に流入する冷媒量が冷媒分配手段により調節されるため、均一性が更に向上する。

【００１１】

【発明の実施の形態】次に、本発明の実施形態について、図面を参照して説明する。図１に示す熱交換器は、プレート状の冷媒流通部１１と波形の冷却フィン１２とが交互に積層されて構成されたものである。図２は、背面側から見た場合の熱交換器の斜視図である。

【００１２】冷媒流通部１１は、図３にも示すように絞り加工を施された略矩形状の平板１３、１４を重ね合わ

せて外周部と中央部をロウ付けしたものである。冷媒流通部１１には、それぞれ独立して冷媒が流通される冷媒流路Ｒ１，Ｒ２が並んで設けられており、下部には、それぞれ冷媒流路Ｒ１，Ｒ２の冷媒入口１５ａと冷媒出口１６ｂとが並んで設けられている。上部にはそれぞれ冷媒流路Ｒ１，Ｒ２の冷媒出口１５ｂと冷媒入口１６ａとが並んで設けられている。

【００１３】冷媒流通部１１には、冷媒流路Ｒ１，Ｒ２をなす平板１３，１４を外側から陥没させて複数のディンプル１７が形成されており、これらディンプル１７によって冷媒流路Ｒ１，Ｒ２には複数の膨出部１８が形成されている。なお、平板１３，１４の間にインナーフィンを挟んで冷媒流路Ｒ１，Ｒ２を形成してもよい。

【００１４】冷媒入口１５ａは、図３に示すように平板１３，１４に形成された開口部１３－１ａ，１４－１ａからなり、各冷媒流通部１１に設けられる冷媒入口１５ａは、図４に示すように冷却フィン１２を挟まずに突き合わされて連続した入口側空間（冷媒流動空間）Ｓin1を形成している。冷媒出口１５ｂは、同様に平板１３，１４に形成された開口部１３－１ｂ，１４－１ｂからなり、各冷媒流通部１１に設けられる冷媒出口１５ｂは、図５に示すように冷却フィン１２を挟まずに突き合わされて連続した出口側空間（冷媒流動空間）Ｓout1を形成している。図示は省略するが、同様に、冷媒入口１６ａは平板１３，１４に形成された開口部１３－２ａ，１４－２ａからなって入口側空間（冷媒流動空間）Ｓin2を形成しており、冷媒出口１６ｂは平板１３，１４に形成された開口部１３－２ｂ，１４－２ｂからなって出口側空間（冷媒流動空間）Ｓout2を形成している（図１参照）。すなわち、冷媒流通部１１には、入口側空間Ｓin1と出口側空間Ｓout2とが、出口側空間Ｓout1と入口側空間Ｓin2とがそれぞれ隣り合って位置している。また、図１に示すように出口側空間Ｓout1と入口側空間Ｓin2の一端は閉塞されているとともに、図２に示す他端は連通流路３０によって接続されている。

【００１５】上記のような構造の熱交換器では、冷媒は入口側空間Ｓin1を図中の矢印方向に進む過程で各冷媒流通部１１に分配され、各冷媒流路Ｒ１を流通する過程で蒸発気化され、出口側空間Ｓout1において合流する。次いで、迫通流路３９を経て入口空間Ｓin2を出口空間Ｓout1と逆方向に進み、その過程で各冷媒流通部１１に分配され、各冷媒流路Ｒ２を流通する過程で更に蒸発気化され、出口側空間Ｓout2において再び合流して流出される。

【００１６】ところで、図３からわかるように、冷媒入口１５ａをなす平板１３の開口部１３－１ａは、同じく冷媒入口１５ａをなす平板１４の開口部１４－１ａよりも小さく形成されている。しかも、図４に示すように、開口部１４－１ａは各冷媒流通部１１とも同じ位置に形成されているが、開口部１３－１ａは各冷媒流通部１１

においてそれぞれ異なった位置に形成されている。つまり、冷媒流通部１１が積層されることで、開口部１３－１ａが形成された部分は冷媒入口１５ａをなす開口部１４－１ａへの冷媒の流通を阻む邪魔板（冷媒分配手段）２０としての機能を与えられており、開口部１３－１ａは隣り合う邪魔板２０に設けられるものどうしで冷媒の流通方向に重複しないように配置されている。なお、図示は省略するが、冷媒入口１６ａをなす平板１４の開口部１４－２ａも、同様に構成されている（図３参照）。以下、入口側空間Ｓin1について説明するが、入口側空間Ｓin2についても同様である。

【００１７】この熱交換器においては、入口側空間Ｓin1を流通する冷媒は各邪魔板２０に形成された開口部１３－１ａを通過しながら下流に向かうが、開口部１３－１ａを通過し得なかった冷媒は邪魔板２０に導かれて冷媒流路Ｒ１に流入する。

【００１８】しかも、開口部１３－１ａは隣り合う邪魔板２０に設けられるものどうしで重複しないように配置されていることから、例えば上流側の邪魔板２０ａの開口部１３－１ａを通過した冷媒の一部は、下流側に隣り合う邪魔板２０ｂの開口部１３－１ａを通過する際に邪魔板２０ｂに流れを阻まれて開口部１３－１ａを通過できず、邪魔板２０ｂに導かれて冷媒流路Ｒ１に流入する。

【００１９】このように、隣り合う邪魔板２０に設けられる開口部１３－１ａどうしが重複しないように配置されていることで、冷媒が滞りがちであった冷媒流通部１１にもより多くの冷媒が分配されるようになり、複数設けられる冷媒流通部１１のいずれにも均一に冷媒を分配することができる。

【００２０】なお、開口部１３－１ａは邪魔板２０に一つだけ形成されるとは限らず、例えば図６に示すように複数設けられ、しかも各開口部１３－１ａの大きさがそれぞれ異なって形成されていてもよい。また、邪魔板２０は平板１４側に設けられていてもよい。さらにまた、邪魔板２０は全ての平板１３（１４）に形成されている必要はなく、入口側空間Ｓin1およびＳin2の中で、少なくとも一カ所設けられていればよい。

【００２１】なお、変形例として以下のように構成してもよい。なお、以下においても入口側空間Ｓin1についてのみ説明するが、入口側空間Ｓin2についても同様である。本例における熱交換器では、開口部１３－１ａは図７に示すように冷媒の流通方向に位置する邪魔板２１ほど小さく形成されている。例えば、上流側の邪魔板２１ａの開口部１３－１ａを通過した冷媒の一部は、下流側に隣り合う邪魔板２１ｂの開口部１３－１ａを通過する際に邪魔板２１ｂに流れを阻まれて開口部１３－１ａを通過できず、邪魔板２１ｂに導かれて冷媒流路Ｒ１に流入する。

【００２２】このように、冷媒の流通方向に位置する邪

庭板２１ほど開口部１３－１ａが小さく形成されることで．複数設けられる冷媒流通部１１のいずれにも均一に冷媒を分配することができる。

【００２３】このように．本例の熱交換器では．冷媒が２つの冷媒流路Ｒ１、Ｒ２に片側ずつ流れるので．冷媒の滞りによる過熱が防止される。また．入口側空間Ｓｉｎ１、Ｓｉｎ２は、冷媒流動方向が逆となっているから．たとえ入口側空間Ｓｉｎ１において冷媒の流通が不均一になり、上流または下流側が過熱しても、入口側空間Ｓｉｎ２を流動する冷媒によって過熱が解消される。さらに、邪庭板２０（２１）によって冷媒が分配されるから．より均一に冷媒流通部１１に冷媒を分配することができる。

【００２４】なお、図８に示すように．入口側空間Ｓｉｎ１とＳｉｎ２、出口側空間Ｓｏｕｔ１とＳｏｕｔ２とを隣り合わせて位置させ．出口側空間Ｓｏｕｔ１と入口側空間Ｓｉｎ２とを連通流路３０’によって接続することとしてもよい。

【００２５】

【発明の効果】以上説明したように．本発明においては．冷媒が２つの冷媒流路に片側ずつ流れるので．冷媒の滞りによる過熱が防止される。また．冷媒分配手段が設けられていることにより．より均一に冷媒を分配することが可能である。

【図面の簡単な説明】

【図１】　本発明に係る熱交換器の実施形態を示す斜視図である。

【図２】　同熱交換器を背面から見た斜視図である。

【図３】　図１の熱交換器を構成する冷媒流通部を示す分解斜視図である。

＊【図４】　入口側空間とこれにつながる冷媒流路を示す断面図である。

【図５】　出口側空間とこれにつながる冷媒流路を示す断面図である。

【図６】　同熱交換器に類似する実施形態を示す図であって．各邪庭板に形成される展開図である。

【図７】　本発明の変形例であって．入口側空間とこれにつながる冷媒流路を示す断面図である。

【図８】　本発明の変形例として示した熱交換器を背面から見た斜視図である。

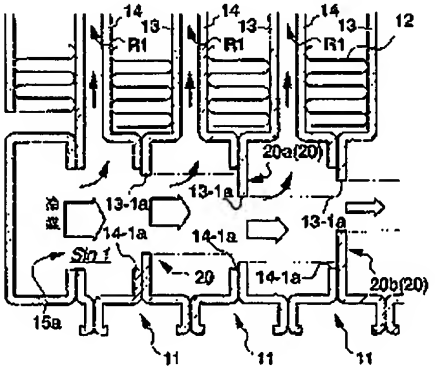
【図９】　従来のエバポレータの一例を示す斜視図である。

【図１０】　従来のエバポレータにおける入口側空間とこれにつながる冷媒流路を示す断面図である。

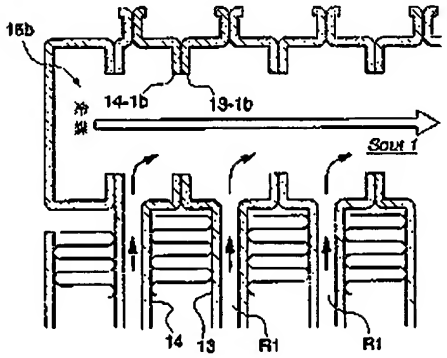
【符号の説明】

１１　　冷媒流通部
１２　　冷却フィン
１３．１４　平板
１３－１ａ、１３－１ｂ．１３－２ａ．１３－２ｂ　開口部
１４－１ａ、１４－１ｂ．１４－２ａ．１４－２ｂ　開口部
１５ａ　　冷媒入口
１５ｂ　　冷媒出口
１６ａ　　冷媒入口
１６ｂ　　冷媒出口
Ｒ１．Ｒ２　冷媒流路
Ｓｉｎ１，Ｓｉｎ２　　入口側空間（冷媒流動空間）
Ｓｏｕｔ１．Ｓｏｕｔ２　出口側空間（冷媒流動空間）

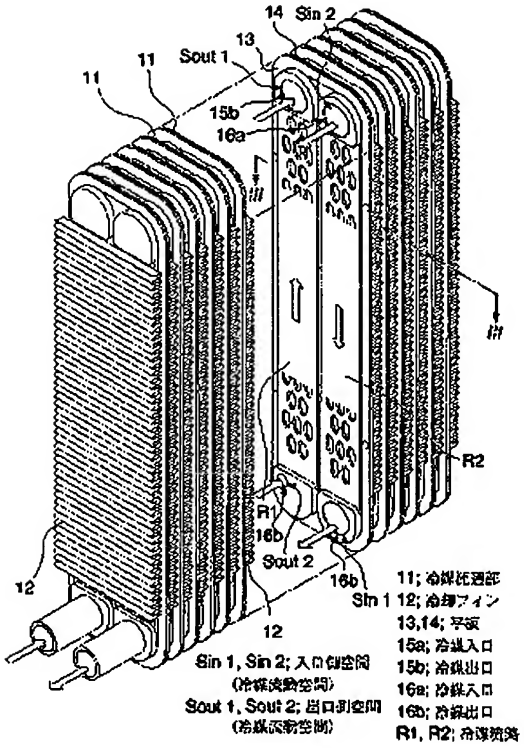
【図４】



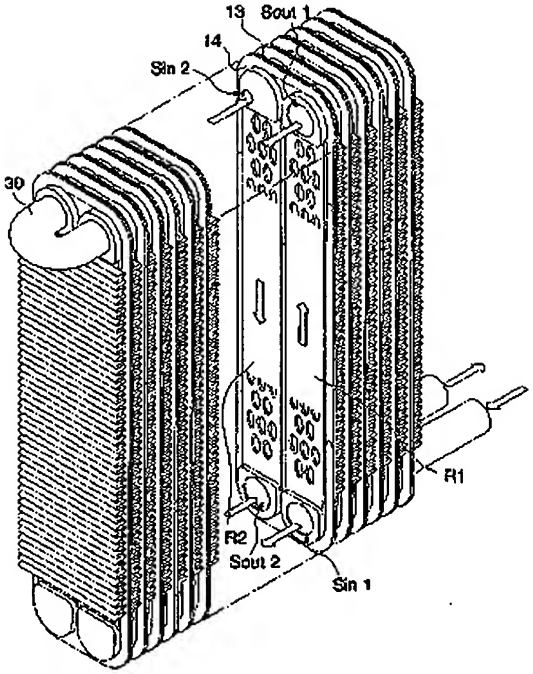
【図５】



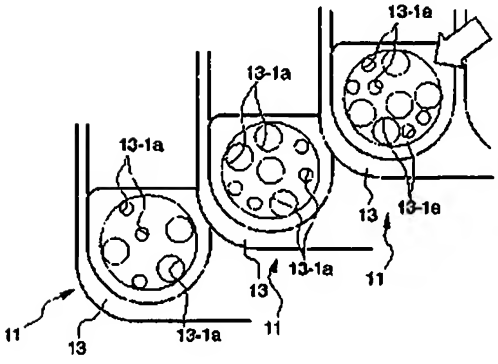
【図１】


14 Sin 2
13
11 Sout 1
11
15b
16a
III
III
R2
R1
16b
Sout 2
16b
12
12
Sin 1
Sin 1, Sin 2; 入口側空間
(冷媒流動空間)
Sout 1, Sout 2; 出口側空間
(冷媒流動空間)
11; 冷媒流通部
12; 冷却フィン
13,14; 平板
15a; 冷媒入口
15b; 冷媒出口
16a; 冷媒入口
16b; 冷媒出口
R1, R2; 冷媒流路

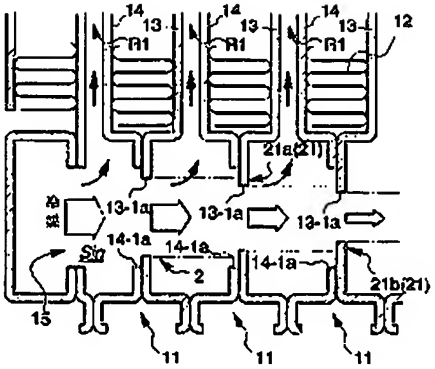
【図２】


13 Sout 1
14
Sin 2
30
R1
R2
Sout 2
Sin 1

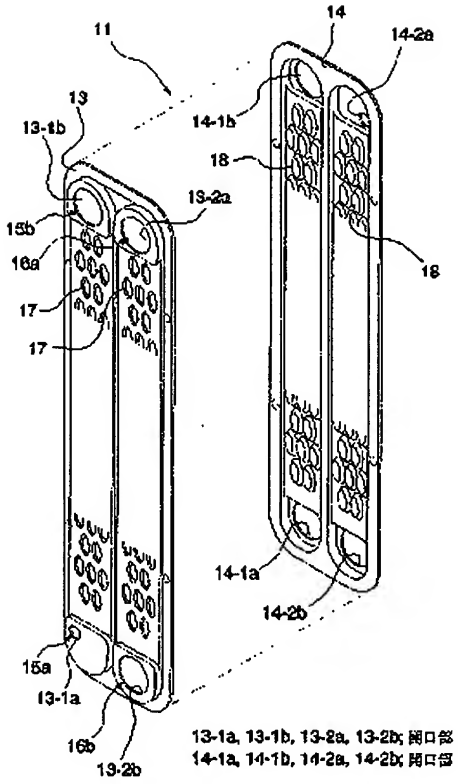
【図６】


13-1a
13-1a
13-1a
13
13-1a
13
13-1a
11
11
13
13-1a
11

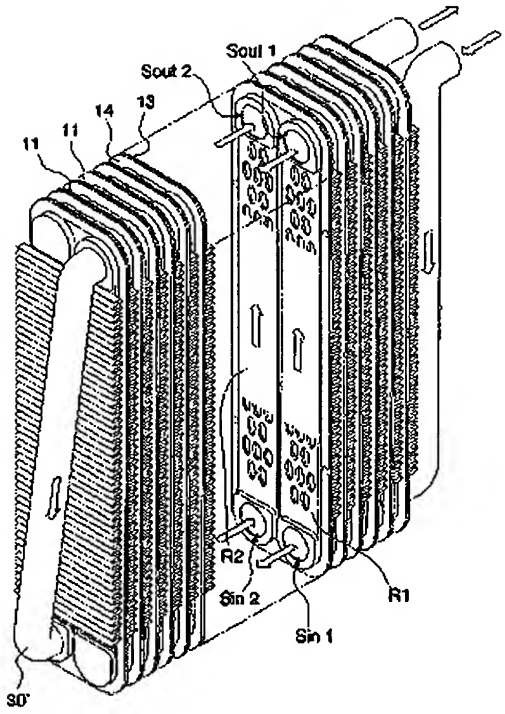
【図７】


14
13
R1
12
21a
21
冷媒
13-1a
14-1a
Sin
2
15
21b(21)
11

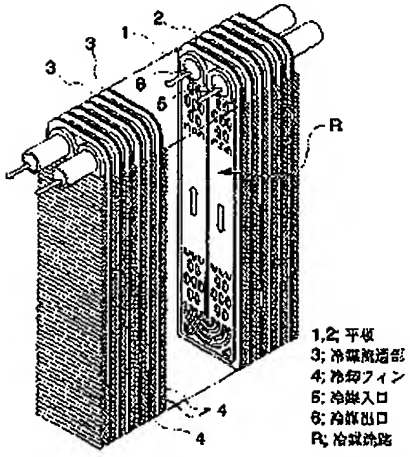
【図３】


11
14
14-2a
13
13-1b
14-1b
18
13-2a
15b
16a
17
17
18
14-1a
14-2b
15a
13-1a
16b
13-2b
13-1a, 13-1b, 13-2a, 13-2b; 開口部
14-1a, 14-1b, 14-2a, 14-2b; 開口部

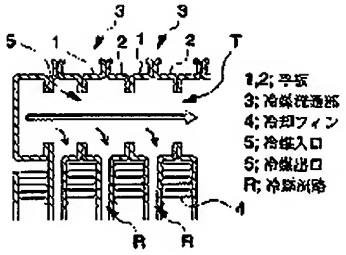
【図８】


Sout 2
Sout 1
14
13
11
11
R2
Sin 2
R1
Sin 1
30

【図９】


2
1
3
3
6
5
R
4
4
1,2; 平板
3; 冷媒流通部
4; 冷却フィン
5; 冷媒入口
6; 冷媒出口
R; 冷媒流路

【図１０】


3
3
5
1
2
1
2
T
1,2; 平板
3; 冷媒流通部
4; 冷却フィン
5; 冷媒入口
6; 冷媒出口
R; 冷媒流路
4
R
R

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CLAIMS

[Claim(s)]
[Claim 1]It has the following, one end of each of said refrigerant drift space is a blocked end blockaded, and the other end is an open end which is carrying out the opening, A heat exchanger, wherein an open end of said refrigerant drift space formed of one opening of one refrigerant passage among said two refrigerant passages is connected with an open end of said refrigerant drift space formed of one opening of a refrigerant passage of another side.
A refrigerant circulation part and a cooling fin of plate shape in which a plate of two sheets to which spinning was performed was piled up, and a refrigerant passage was established in an inside are laminated by turns, and are constituted, An opening which carries out an opening is formed in said refrigerant passage at said plate of two sheets, respectively, Two refrigerant passages where it is a heat exchanger of the 2-block specification in which refrigerant drift space which the openings of a refrigerant circulation part which is furthermore laminated and adjoins each other were compared, and continued was formed, and, as for said refrigerant circulation part, a refrigerant circulates independently respectively.
Said opening provided in each both ends of these refrigerant passages.

[Claim 2]A heat exchanger, wherein a refrigerant distribution means to adjust a refrigerant amount supplied to said refrigerant passage is formed in at least one of said the refrigerant drift space in the heat exchanger according to claim 1.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the heat exchanger provided in a conditioner etc.
[0002]
[Description of the Prior Art]An example of the structure of the heat exchanger of the 2-block specification used for the conditioner for vehicles, etc. as an evaporator (evaporator) is shown in drawing 9. The heat exchanger shown in a figure is called a DORON cup type, and the refrigerant circulation part 3 of the plate shape which piled up the plates 1 and 2 of the rectangular shape to which spinning was performed, and the cooling fin 4 crooked in the waveform are laminated by turns, and it is constituted.
[0003]The refrigerant passage R of U shape from which it escapes to the refrigerant exit 6 which went and came back to the lower part from the refrigerant inlet 5 established in the upper part, and was established in the upper part along with the refrigerant inlet 5 by low attachment of the peripheral part and center section of the plates 1 and 2 being carried out is formed in the inside of the refrigerant circulation part 3.
[0004]In this heat exchanger, in the refrigerant inlet 5, it is distributed to each refrigerant circulation part 3, evaporation evaporation is carried out in the process in which the refrigerant passage R is circulated, and a refrigerant joins again in the refrigerant exit 6, and flows out of a heat exchanger.
[0005]
[Problem(s) to be Solved by the Invention]By the way, the following problems are pointed out to the heat exchanger of the above structures. That is, as shown in drawing 10, the continuous space (it is hereafter called a tank.) T formed by laminating the refrigerant inlet 5 is formed, and the refrigerant which flowed into the heat exchanger is distributed to each refrigerant circulation part 3 in the process in which he follows this continuous space to the arrow direction in a figure. However, in the conventional heat exchanger, the refrigerant supplied to the tank T was in the tendency to flow to the refrigerant passage R of the upstream mostly that it is hard to arrive to the back of the tank T, and there was a case where the flow of a refrigerant was overdue at the downstream of the tank T. For this reason, in the refrigerant passage R which distribution of the refrigerant to each refrigerant circulation part 3 is no longer performed uniformly, and is located in the downstream of the tank T, there was a problem that would be in overheating and heat exchange was no longer performed fully.
[0006]This invention is accomplished in light of the above-mentioned circumstances, and it aims at providing the heat exchanger which can aim at improvement in heat exchanging performance by distributing a refrigerant to a refrigerant passage uniformly.
[0007]
[Means for Solving the Problem]A refrigerant circulation part and a cooling fin of plate shape in which a plate of two sheets to which spinning was performed was piled up, and a refrigerant passage was established in an inside are laminated by turns, and the invention according to claim 1 is

constituted, An opening which carries out an opening is formed in said refrigerant passage at said plate of two sheets, respectively, Refrigerant drift space which the openings of a refrigerant circulation part which is furthermore laminated and adjoins each other were compared, and continued is a heat exchanger of the formed 2-block specification, and said refrigerant circulation part, It has two refrigerant passages where a refrigerant circulates independently respectively, and said opening provided in each both ends of these refrigerant passages, One end of each of said refrigerant drift space is a blocked end blockaded, and the other end is an open end which is carrying out the opening, An open end of said refrigerant drift space formed of one opening of one refrigerant passage among said two refrigerant passages is connected with an open end of said refrigerant drift space formed of one opening of a refrigerant passage of another side.

[0008]A refrigerant in which this invention passed through one refrigerant passage in a heat exchanger of the 2-block specification in which each refrigerant circulation part has a refrigerant passage of two rows once flows into refrigerant drift space, and circulates other refrigerant passages after that again. Thus, since a refrigerant flows through two refrigerant passages every [single-sided], stagnation of a refrigerant is prevented and it is hard to generate overheating.

[0009]A refrigerant distribution means by which the invention according to claim 2 adjusts a refrigerant amount supplied to said refrigerant passage to at least one of said the refrigerant drift space in the heat exchanger according to claim 1 is formed.

[0010]In this heat exchanger, since a refrigerant amount which flows into each refrigerant passage is adjusted by a refrigerant distribution means, homogeneity improves further.

[0011]

[Embodiment of the Invention]Next, the embodiment of this invention is described with reference to drawings. The refrigerant circulation part 11 of plate shape and the wave-like cooling fin 12 are laminated by turns, and the heat exchanger shown in drawing 1 is constituted. Drawing 2 is a perspective view of the heat exchanger at the time of seeing from the back side.

[0012]The refrigerant circulation part 11 piles up the plates 13 and 14 of the approximately rectangular shape to which spinning was performed as shown also in drawing 3, and carries out low attachment of a peripheral part and the center section. The refrigerant passage R1 where a refrigerant circulates independently, respectively, and R2 are located in a line, and they are provided in the refrigerant circulation part 11, and the refrigerant passage R1, and the refrigerant inlet 15a and the refrigerant exit 16b of R2 are located in a line, and are established in the lower part, respectively. The refrigerant passage R1, and the refrigerant exit 15b and the refrigerant inlet 16a of R2 are located in a line, and are established in the upper part, respectively.

[0013]The refrigerant passage R1 and the plates 13 and 14 which make R2 are collapsed in the refrigerant circulation part 11 from the outside, two or more dimples 17 are formed in it, and two or more bulged parts 18 are formed in the refrigerant passage R1 and R2 of these dimples 17. On both sides of an inner fin, the refrigerant passage R1 and R2 may be formed among the plates 13 and 14.

[0014]The refrigerant inlet 15a which the refrigerant inlet 15a consists of opening 13-1a and 14-1a which were formed in the plates 13 and 14 as shown in drawing 3, and is established in each refrigerant circulation part 11, Entrance-side space (refrigerant drift space) Sin1 which was compared without pinching the cooling fin 12 as shown in drawing 4, and continued is formed. The refrigerant exit 15b which the refrigerant exit 15b consists of opening 13-1b and 14-1b which were similarly formed in the plates 13 and 14, and is established in each refrigerant circulation part 11 forms outlet side space (refrigerant drift space) Sout1 which was compared without pinching the cooling fin 12 as shown in drawing 5, and continued. Although a graphic display is omitted, Opening 13-2a by which similarly the refrigerant inlet 16a was formed in the plates 13 and 14, It consists of 14-2a and entrance-side space (refrigerant drift space) Sin2 is formed, and the refrigerant exit 16b consists of opening 13-2b and 14-2b which were formed in the plates 13 and 14, and forms outlet side space (refrigerant drift space) Sout2 (refer to drawing 1). That is, outlet side space Sout1 and entrance-side space Sin2 adjoin each other, respectively, and entrance-side space Sin1 and outlet

side space Sout2 are located in the refrigerant circulation part 11. As shown in drawing 1, while one end of outlet side space Sout1 and entrance-side space Sin2 is blockaded, the other end shown in drawing 2 is connected by the free passage channel 30.

[0015]In the heat exchanger of the above structures, a refrigerant is distributed to each refrigerant circulation part 11 in the process in which he follows entrance-side space Sin1 to the arrow direction in a figure, and in the process in which each refrigerant passage R1 is circulated, evaporation evaporation is carried out and it joins in outlet side space Sout1. Subsequently, he follows entrance space Sin2 to exit space Sout1 and an opposite direction through the free passage channel 30, and it is distributed to each refrigerant circulation part 11 in the process, and in the process in which each refrigerant passage R2 is circulated, in outlet side space Sout2, evaporation evaporation is carried out further, and it joins again, and flows out.

[0016]By the way, opening 13-1a of the plate 13 which makes the refrigerant inlet 15a is formed smaller than opening 14-1a of the plate 14 which similarly makes the refrigerant inlet 15a so that drawing 3 may show. And as shown in drawing 4, opening 14-1a is formed in the same position also as each refrigerant circulation part 11, but opening 13-1a is formed in a position which is different in each refrigerant circulation part 11, respectively. That is, the portion in which opening 13-1a was formed in the refrigerant circulation part 11 being laminated has given the function as the baffle (refrigerant distribution means) 20 which obstructs circulation of the refrigerant to opening 14-1a which makes the refrigerant inlet 15a, Opening 13-1a is arranged so that it may not overlap with the circulation direction of a refrigerant in what are provided in the adjacent baffle 20. Although a graphic display is omitted, opening 14-2a of the plate 14 which makes the refrigerant inlet 16a is constituted similarly (refer to drawing 3). Although entrance-side space Sin1 is explained hereafter, the same may be said of entrance-side space Sin2.

[0017]In this heat exchanger, although the refrigerant which circulates entrance-side space Sin1 goes downstream, passing opening 13-1a formed in each baffle 20, the refrigerant which could not pass opening 13-1a is led to the baffle 20, and flows into the refrigerant passage R1.

[0018]And opening 13-1a from being arranged so that it may not overlap in what are provided in the adjacent baffle 20. For example, when some refrigerants which passed opening 13-1a of the baffle 20a of the upstream pass opening 13-1a of the baffle 20b which adjoins the downstream, it has a flow obstructed by the baffle 20b, and cannot pass opening 13-1a, but it is led to the baffle 20b, and flows into the refrigerant passage R1.

[0019]By thus, the thing arranged so that opening 13-1a provided in the adjacent baffle 20 may not overlap. A nearby refrigerant many comes to be distributed to the refrigerant circulation part 11 in which the refrigerant tended to be overdue, and a refrigerant can be uniformly distributed to all of the refrigerant circulation part 11 provided. [two or more]

[0020]Two or more opening 13-1a is provided, as only one is not always formed in the baffle 20, for example, it is shown in drawing 6, moreover, differs in the size of each opening 13-1a, respectively, and may be formed. The baffle 20 may be formed in the plate 14 side. The baffle 20 needs to be formed in no plates 13 (14), and should just be formed at least one place in the entrance-side space Sin1 and Sin2 further again.

[0021]It may constitute as follows as a modification. Although only entrance-side space Sin1 is explained below, the same may be said of entrance-side space Sin2. In the heat exchanger in this example, opening 13-1a is formed small [baffle / about 21 / which is located in the circulation direction of a refrigerant as shown in drawing 7]. For example, when some refrigerants which passed opening 13-1a of the baffle 21a of the upstream pass opening 13-1a of the baffle 21b which adjoins the downstream, it has a flow obstructed by the baffle 21b, and cannot pass opening 13-1a, but it is led to the baffle 21b, and flows into the refrigerant passage R1.

[0022]Thus, a refrigerant can be uniformly distributed to all of the refrigerant circulation part 11 provided by opening 13-1a being formed small as for about 21 baffle located in the circulation direction of a refrigerant. [two or more]

[0023]Thus, in the heat exchanger of this example, since a refrigerant flows into the two refrigerant passages R1 and R2 every [single-sided], overheating by stagnation of a refrigerant is prevented. Since entrance-side space Sin1 and Sin2 have the reverse refrigerant stream moving direction, even if circulation of a refrigerant becomes uneven in entrance-side space Sin1 even if and the upper stream or the downstream is overheated, overheating is canceled with the refrigerant which flows entrance-side space Sin2. Since a refrigerant is distributed by the baffle 20 (21), a refrigerant can be distributed more to homogeneity at the refrigerant circulation part 11.
[0024]As shown in drawing 8, it is good also as making the entrance-side space Sin1 and Sin2 and the outlet side space Sout1 and Sout2 adjoin each other, making it located, and connecting outlet side space Sout1 and entrance-side space Sin2 by free passage channel 30'.
[0025]
[Effect of the Invention]As explained above, since a refrigerant flows into two refrigerant passages every [single-sided], overheating by stagnation of a refrigerant is prevented in this invention. It is possible by forming the refrigerant distribution means to distribute a refrigerant to homogeneity more.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]This invention relates to the heat exchanger provided in a conditioner etc.

[Translation done.]

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PRIOR ART

[Description of the Prior Art]An example of the structure of the heat exchanger of the 2-block specification used for the conditioner for vehicles, etc. as an evaporator (evaporator) is shown in drawing 9. The heat exchanger shown in a figure is called a DORON cup type, and the refrigerant circulation part 3 of the plate shape which piled up the plates 1 and 2 of the rectangular shape to which spinning was performed, and the cooling fin 4 crooked in the waveform are laminated by turns, and it is constituted.
[0003]The refrigerant passage R of U shape from which it escapes to the refrigerant exit 6 which went and came back to the lower part from the refrigerant inlet 5 established in the upper part, and was established in the upper part along with the refrigerant inlet 5 by low attachment of the peripheral part and center section of the plates 1 and 2 being carried out is formed in the inside of the refrigerant circulation part 3.
[0004]In this heat exchanger, in the refrigerant inlet 5, it is distributed to each refrigerant circulation part 3, evaporation evaporation is carried out in the process in which the refrigerant passage R is circulated, and a refrigerant joins again in the refrigerant exit 6, and flows out of a heat exchanger.

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EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, in this invention, a refrigerant flows into two refrigerant passages every [single-sided].
Therefore, overheating by stagnation of a refrigerant is prevented.
It is possible by forming the refrigerant distribution means to distribute a refrigerant to homogeneity more.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]By the way, the following problems are pointed out to the heat exchanger of the above structures. That is, as shown in drawing 10, the continuous space (it is hereafter called a tank.) T formed by laminating the refrigerant inlet 5 is formed, and the refrigerant which flowed into the heat exchanger is distributed to each refrigerant circulation part 3 in the process in which he follows this continuous space to the arrow direction in a figure. However, in the conventional heat exchanger, the refrigerant supplied to the tank T was in the tendency to flow to the refrigerant passage R of the upstream mostly that it is hard to arrive to the back of the tank T, and there was a case where the flow of a refrigerant was overdue at the downstream of the tank T. For this reason, in the refrigerant passage R which distribution of the refrigerant to each refrigerant circulation part 3 is no longer performed uniformly, and is located in the downstream of the tank T, there was a problem that would be in overheating and heat exchange was no longer performed fully.
[0006]This invention is accomplished in light of the above-mentioned circumstances, and it aims at providing the heat exchanger which can aim at improvement in heat exchanging performance by distributing a refrigerant to a refrigerant passage uniformly.

[Translation done.]

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MEANS

[Means for Solving the Problem]A refrigerant circulation part and a cooling fin of plate shape in which a plate of two sheets to which spinning was performed was piled up, and a refrigerant passage was established in an inside are laminated by turns, and the invention according to claim 1 is constituted, An opening which carries out an opening is formed in said refrigerant passage at said plate of two sheets, respectively, Refrigerant drift space which the openings of a refrigerant circulation part which is furthermore laminated and adjoins each other were compared, and continued is a heat exchanger of the formed 2-block specification, and said refrigerant circulation part, It has two refrigerant passages where a refrigerant circulates independently respectively, and said opening provided in each both ends of these refrigerant passages, One end of each of said refrigerant drift space is a blocked end blockaded, and the other end is an open end which is carrying out the opening, An open end of said refrigerant drift space formed of one opening of one refrigerant passage among said two refrigerant passages is connected with an open end of said refrigerant drift space formed of one opening of a refrigerant passage of another side.
[0008]A refrigerant in which this invention passed through one refrigerant passage in a heat exchanger of the 2-block specification in which each refrigerant circulation part has a refrigerant passage of two rows once flows into refrigerant drift space, and circulates other refrigerant passages after that again. Thus, since a refrigerant flows through two refrigerant passages every [single-sided], stagnation of a refrigerant is prevented and it is hard to generate overheating.
[0009]A refrigerant distribution means by which the invention according to claim 2 adjusts a refrigerant amount supplied to said refrigerant passage to at least one of said the refrigerant drift space in the heat exchanger according to claim 1 is formed.
[0010]In this heat exchanger, since a refrigerant amount which flows into each refrigerant passage is adjusted by a refrigerant distribution means, homogeneity improves further.
[0011]
[Embodiment of the Invention]Next, the embodiment of this invention is described with reference to drawings. The refrigerant circulation part 11 of plate shape and the wave-like cooling fin 12 are laminated by turns, and the heat exchanger shown in drawing 1 is constituted. Drawing 2 is a perspective view of the heat exchanger at the time of seeing from the back side.
[0012]The refrigerant circulation part 11 piles up the plates 13 and 14 of the approximately rectangular shape to which spinning was performed as shown also in drawing 3, and carries out low attachment of a peripheral part and the center section. The refrigerant passage R1 where a refrigerant circulates independently, respectively, and R2 are located in a line, and they are provided in the refrigerant circulation part 11, and the refrigerant passage R1, and the refrigerant inlet 15a and the refrigerant exit 16b of R2 are located in a line, and are established in the lower part, respectively. The refrigerant passage R1, and the refrigerant exit 15b and the refrigerant inlet 16a of R2 are located in a line, and are established in the upper part, respectively.
[0013]The refrigerant passage R1 and the plates 13 and 14 which make R2 are collapsed in the

refrigerant circulation part 11 from the outside, two or more dimples 17 are formed in it, and two or more bulged parts 18 are formed in the refrigerant passage R1 and R2 of these dimples 17. On both sides of an inner fin, the refrigerant passage R1 and R2 may be formed among the plates 13 and 14.
[0014]The refrigerant inlet 15a which the refrigerant inlet 15a consists of opening 13-1a and 14-1a which were formed in the plates 13 and 14 as shown in drawing 3, and is established in each refrigerant circulation part 11, Entrance-side space (refrigerant drift space) Sin1 which was compared without pinching the cooling fin 12 as shown in drawing 4, and continued is formed. The refrigerant exit 15b which the refrigerant exit 15b consists of opening 13-1b and 14-1b which were similarly formed in the plates 13 and 14, and is established in each refrigerant circulation part 11 forms outlet side space (refrigerant drift space) Sout1 which was compared without pinching the cooling fin 12 as shown in drawing 5, and continued. Although a graphic display is omitted, Opening 13-2a by which similarly the refrigerant inlet 16a was formed in the plates 13 and 14, It consists of 14-2a and entrance-side space (refrigerant drift space) Sin2 is formed, and the refrigerant exit 16b consists of opening 13-2b and 14-2b which were formed in the plates 13 and 14, and forms outlet side space (refrigerant drift space) Sout2 (refer to drawing 1). That is, outlet side space Sout1 and entrance-side space Sin2 adjoin each other, respectively, and entrance-side space Sin1 and outlet side space Sout2 are located in the refrigerant circulation part 11. As shown in drawing 1, while one end of outlet side space Sout1 and entrance-side space Sin2 is blockaded, the other end shown in drawing 2 is connected by the free passage channel 30.
[0015]In the heat exchanger of the above structures, a refrigerant is distributed to each refrigerant circulation part 11 in the process in which he follows entrance-side space Sin1 to the arrow direction in a figure, and in the process in which each refrigerant passage R1 is circulated, evaporation evaporation is carried out and it joins in outlet side space Sout1. Subsequently, he follows entrance space Sin2 to exit space Sout1 and an opposite direction through the free passage channel 30, and it is distributed to each refrigerant circulation part 11 in the process, and in the process in which each refrigerant passage R2 is circulated, in outlet side space Sout2, evaporation evaporation is carried out further, and it joins again, and flows out.
[0016]By the way, opening 13-1a of the plate 13 which makes the refrigerant inlet 15a is formed smaller than opening 14-1a of the plate 14 which similarly makes the refrigerant inlet 15a so that drawing 3 may show. And as shown in drawing 4, opening 14-1a is formed in the same position also as each refrigerant circulation part 11, but opening 13-1a is formed in a position which is different in each refrigerant circulation part 11, respectively. That is, the baffle with which the portion in which opening 13-1a was formed in the refrigerant circulation part 11 being laminated obstructs circulation of the refrigerant to opening 14-1a which makes the refrigerant inlet 15a

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[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a perspective view showing the embodiment of the heat exchanger concerning this invention.
[Drawing 2]It is the perspective view which looked at the heat exchanger from the back.
[Drawing 3]It is an exploded perspective view showing the refrigerant circulation part which constitutes the heat exchanger of drawing 1.
[Drawing 4]It is a sectional view showing entrance-side space and the refrigerant passage connected with this.
[Drawing 5]It is a sectional view showing outlet side space and the refrigerant passage connected with this.
[Drawing 6]It is a figure showing an embodiment similar to the heat exchanger, and is a development view formed in each baffle.
[Drawing 7]It is a modification of this invention and is a sectional view showing entrance-side space and the refrigerant passage connected with this.
[Drawing 8]It is the perspective view which looked at the heat exchanger shown as a modification of this invention from the back.
[Drawing 9]It is a perspective view showing an example of the conventional evaporator.
[Drawing 10]It is a sectional view showing the refrigerant passage connected with the entrance-side space and this in the conventional evaporator.
[Description of Notations]
11 Refrigerant circulation part
12 Cooling fin
13 and 14 Monotonous
13-1a, 13-1b, 13-2a, and 13-2b Opening
14-1a, 14-1b, 14-2a, and 14-2b Opening
15a Refrigerant inlet
15b Refrigerant exit
16a Refrigerant inlet
16b Refrigerant exit
R1 and R2 Refrigerant passage
Sin1 and Sin2 Entrance-side space (refrigerant drift space)
Sout1 and Sout2 Outlet side space (refrigerant drift space)

[Translation done.]

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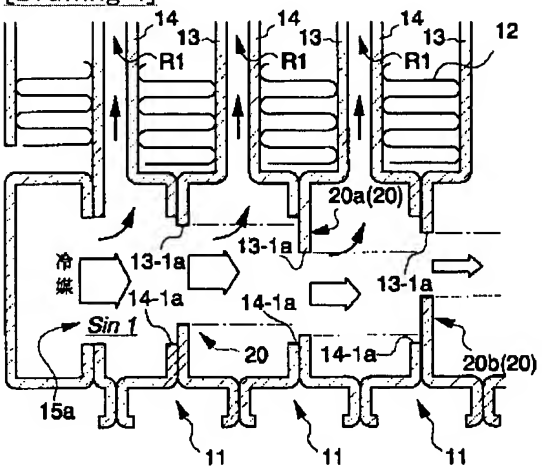
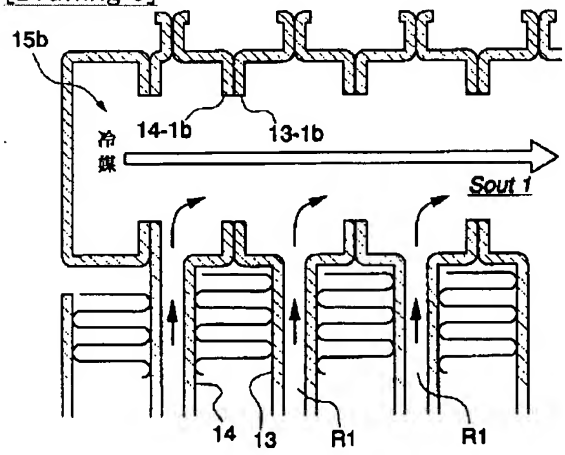
DRAWINGS

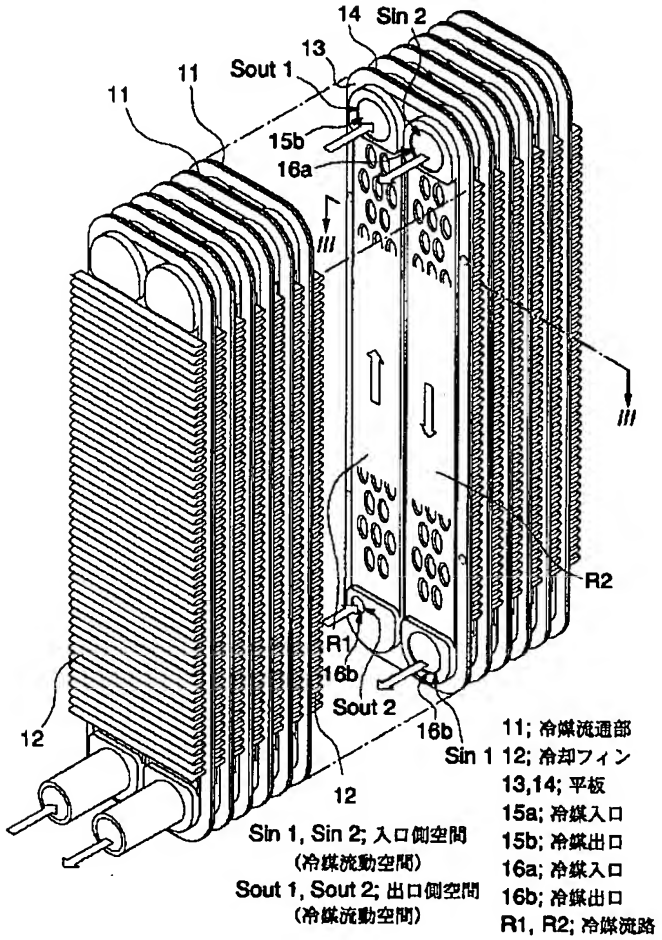
[Drawing 4]



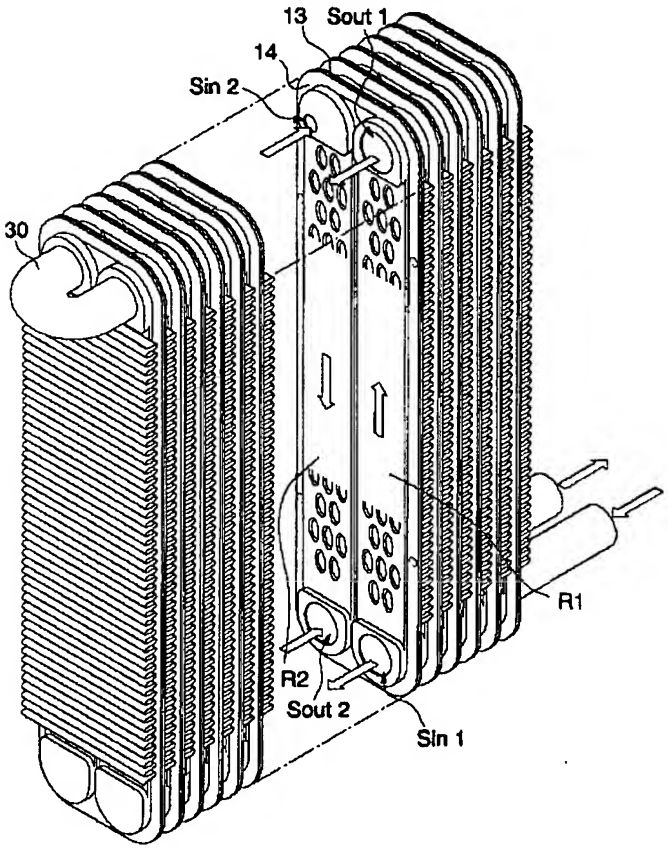
[Drawing 5]



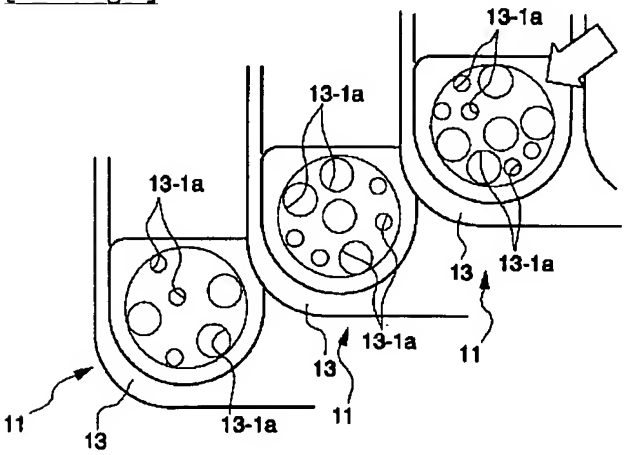
[Drawing 1]


14 Sin 2
13
11
Sout 1
11
15b
16a
III
III
R2
R1
16b
Sout 2
16b
Sin 1
12
12
Sin 1, Sin 2; 入口側空間
(冷媒流動空間)
Sout 1, Sout 2; 出口側空間
(冷媒流動空間)
11; 冷媒流通部
12; 冷却フィン
13,14; 平板
15a; 冷媒入口
15b; 冷媒出口
16a; 冷媒入口
16b; 冷媒出口
R1, R2; 冷媒流路

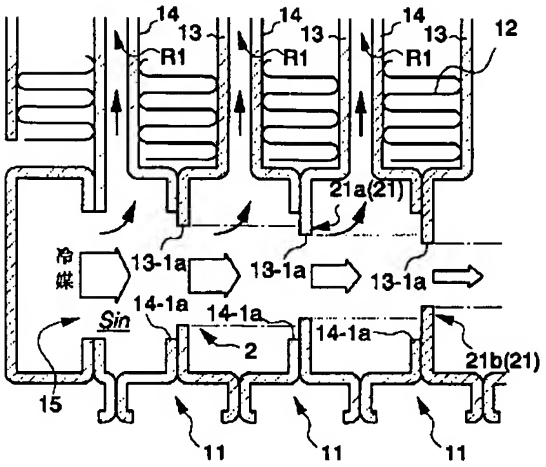
[Drawing 2]



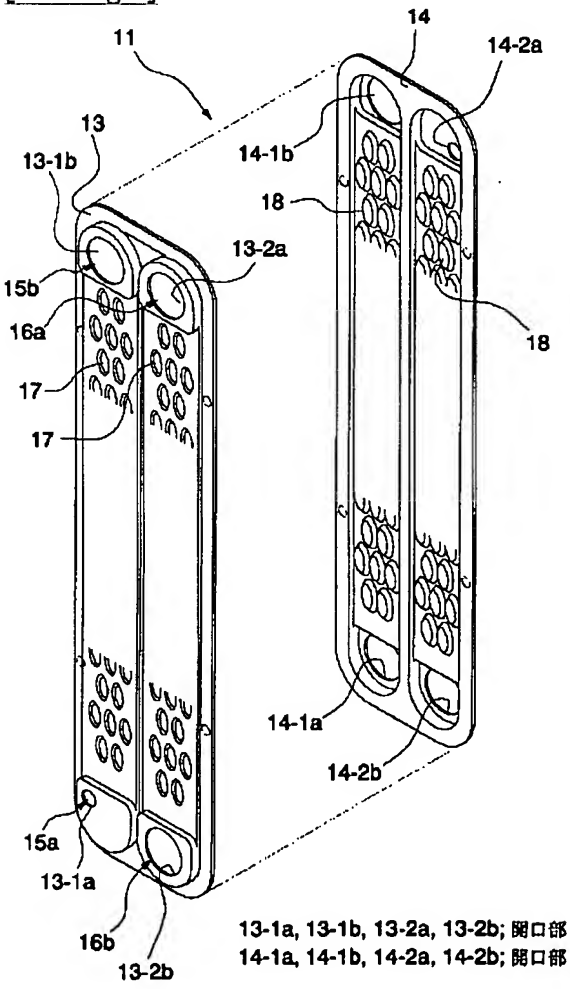
[Drawing 6]



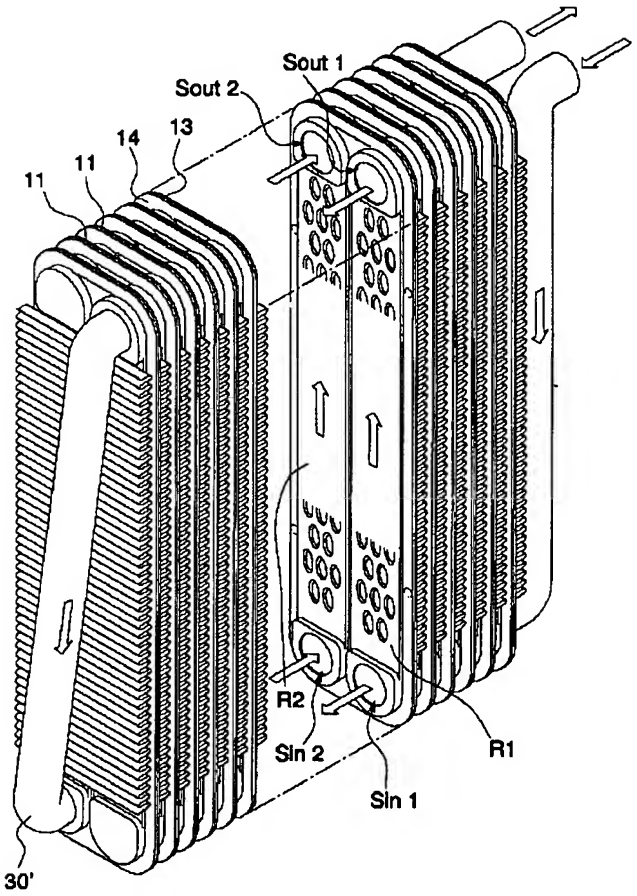
[Drawing 7]



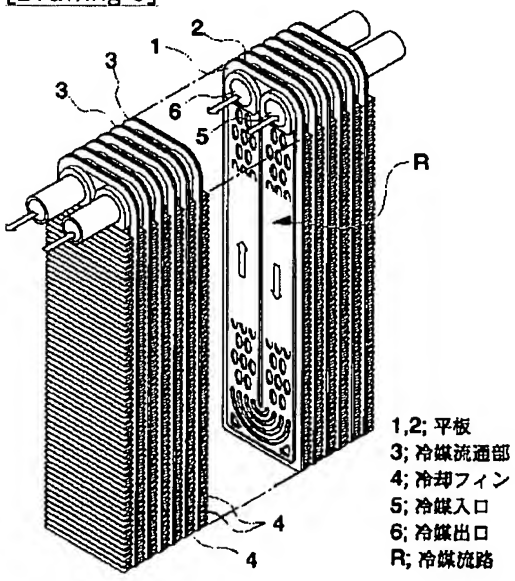
[Drawing 3]



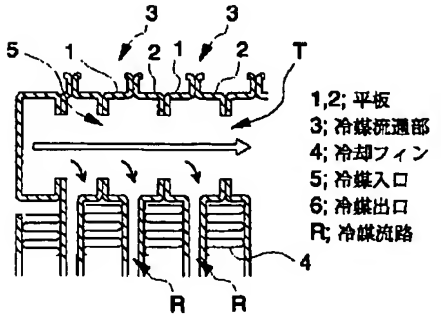
[Drawing 8]



[Drawing 9]



[Drawing 10]



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